

THE CONDOR

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Ornithology



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COOPER ORNITHOLOGICAL CLUB

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A Magazine of Western Ornithology

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CONTENTS

	PAGE
Continuity of Behavior in the Nuttall White-crowned Sparrow (with one chart).....	Barbara D. Blanchard 145
Steps in the Development of the Bird-flower.....	A. L. Pichens 150
Harry Schelwald Swarth (with three ill.).....	Jean M. Linsdale 155
FROM FIELD AND STUDY:	
Feeding Habits of the Snowy Egret.....	Chas. W. Michael 168
A Broken Wing Heals.....	Joseph Maillard 169
Surf Scoter in the Cuyamaca Mountains, California.....	Ed N. Harrison 169
Some Observations on the Food of the Prairie Falcon.....	Richard M. Bond 169
A Note on the Nesting of the Bush-tit.....	A. J. van Rossem 170
Hummingbirds of Southwestern Saskatchewan.....	Lawrence B. Potter 170
New Bird Records for Arizona.....	Lyndon L. Hargrave 171
Notes from Maricopa County, Arizona.....	Laurence M. Huey 172
Asiatic Gyrfalcon in the Okanagan Valley, British Columbia.....	J. A. Munro 172
Bird Records from near Phoenix, Arizona.....	Harry L. Crockett and Ruth Crockett 172
A Harris Sparrow Observed near Chico, California.....	Lloyd G. Ingles 173
Notes on Alaskan Birds.....	Herbert Friedmann 173
Vermilion Flycatcher a Victim of the Dwarf Cowbird in California.....	Wilson C. Hanna 174
Notes on a Fight between Alaska Jays and a Weasel.....	Otto Wm. Geist 174
Mockingbird in Eastern Montana.....	Lincoln Ellison 175
Bird Notes from the Papago Indian Reservation, Southern Arizona.....	Gale Monson 175
Nesting of the Allen Hummingbird.....	Ernest D. Clabaugh 176
The Western Palm Warbler in New Mexico.....	A. E. Borell 177
Bird Records from Merced County, California.....	R. H. Beck 177
Twenty Condors Dine Together.....	Lila M. Lofberg 177
California Woodpeckers Storing Walnuts.....	Chas. W. Michael 177
Live Weights of Certain Hawks.....	Richard M. Bond 178
NOTES AND NEWS.....	179
MINUTES OF COOPER CLUB MEETINGS.....	180



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CONTINUITY OF BEHAVIOR IN THE NUTTALL WHITE-CROWNED SPARROW

WITH ONE CHART

By BARBARA D. BLANCHARD

For the past three years I have studied the behavior of the Nuttall White-crowned Sparrow (*Zonotrichia leucophrys nuttalli*) on the University of California campus at Berkeley. In the spring of 1934, when I began intensive study, the population on the campus comprised about sixteen pairs. Since it would have taken too much time to follow up so many birds, I restricted myself to seven pairs on territories in the center of the campus. These I trapped and banded recognizably with colored bands.

The springs of 1934 and 1935 were devoted to the phases of breeding behavior: copulation, nest-building, incubation, hatching and development of the nestlings and fledging of the young. Thereafter I followed the same birds through the interval between breeding seasons, from the post-nuptial molt in autumn to the beginning of nesting the next spring.

During the interbreeding periods I was aware of many familiar elements, scattered manifestations of behavior we are too apt to consider as purely a product of the physiology of the breeding time. Consciously or unconsciously, we stress the discontinuity of breeding and winter behavior. We emphasize changes and beginnings and look on song, territorialism and mutual attraction of opposite sexes as exclusive manifestations of the reproductive period—strictly limited phases which begin and end abruptly. Actually, perhaps, effective breeding behavior is less something new than a coordination of many elements already present, some permanently, some, as far as we can perceive, for short preceding periods.

Copulation, nest-building and patrol of territory ceased at or before the fledging of my birds' last brood. On the other hand, the special and continuous interest in the *mate* as opposed to all others, the observance of territorial boundaries, and the occasional use of full song by the male during every month of the interbreeding period constituted permanent elements of behavior.

Each pair remained on its breeding area throughout fall and winter. Mates foraged and perched together and followed each other about. In some cases the pair remained alone, in others, they were joined by a flock of immature or mateless birds which the male tolerated. Unquestionably, even in the latter cases, when the pair seemed for long periods to be undifferentiated parts of the flock, a definite liaison must have persisted, for with the coming of spring, the male drove out the sojourning strangers, and the pair remated. It is unthinkable that this represented a revived memory of the previous year.

As an example of the tenacity of the bond between mates, I have a definite case in which the second mate of a polygamous male remained with him through the winter and bred with him again, disregarding a young male (mateless in winter and quickly losing a mate acquired in early February) with adjacent territory; the latter sang strongly, especially from March 3 to April 18, shortly after which he acquired a mate from elsewhere. The facts were as follows. In the spring of 1934, two Nuttalls, designated as male I and female III, both had other mates and lived on adjacent territories. Female III lost her mate after she fledged her first brood. Male I then entered her territory, incorporated it in his patrol and mated with her for her second brood. Female III mated with male I again the following year, although an unmated male, already mentioned, was available. That this represented a continued interest of female III in her mate rather than in her previous breeding area is suggested by her behavior during the winter. After her second brood had become independent, she retained no interest in her old area but followed male I into his own where he already had one mate, spent the winter with him there, and the following spring nested in a fraction of it.

As to both permanent occupation of territory, and permanent mating, through the year and from year to year, there seems to be no doubt. Male I has stayed in about the same area for almost four years. He was banded on May 20, 1932, by Dr. Seth B. Benson, at the southwest corner of the Life Sciences Building. At this time, according to Dr. Benson's notes, the bird had partly immature plumage and was probably a bird of the year, hatched in 1931. Dr. Benson states that the bird owned the narrow lawn on the south side of the Life Sciences Building and that on June 3, 1932, he saw it with its mate, feeding a family. I first noticed this male singing in a tree by the same strip of lawn on February 6, 1934. He had apparently remained in about the same area since 1932. The mate of 1932 had probably died, since a few days later I saw him with an unbanded, brown-headed, bird with which he subsequently mated. Up to the present time the pair has stayed in the same area, throughout fall and winter as well as breeding time.

A third permanent element was the use of full song by the male. The song was, to be sure, sporadic and often weaker than during breeding time, but, like interest in mates and restriction to the breeding area, never disappeared.

Before the studies of environmental and physiological changes in which I was interested could be of the slightest value, it was necessary to be sure of the time and manner of the coming of the less permanent behavior elements. I had come to suspect, from the winter behavior itself and from scattered hints in the literature, that these elements would appear gradually, with early and almost imperceptible manifestations. I still suspect as much, but I realize better the difficulty of sufficiently close observation. Actually, the beginnings of change as I detected them were relatively abrupt, so that the apparent cycle, up to egg-laying, lies within about nine weeks.

The behavior of the birds during January, February and March suggested to me the accompanying diagram (fig. 28), which attempts to analyze three principal subdivisions of consummate reproductive behavior, copulation, territorialism, and nest building, and to show the emergence and synchronization of their elements.

Copulation takes place in this way: the female crouches with wings spread and quivering, tail slightly raised and head pointed upward at a sharp angle to the back. She utters a prolonged trill while maintaining this position. When the male approaches, she stops trilling and raises her tail still higher until it is perpendicular to her body. Then the male mounts and copulates with her. The substratum of interest of each bird for its mate is permanent. The other elements appear *seriatim*. Trilling and posturing are not necessarily linked. As early as January 9, and by February 1 at the latest, the

females begin to trill. For the first few weeks trilling is sporadic and may or may not be accompanied by fluttering of the wings. As the season progresses, trilling and posturing occur together more and more often, and both actions increase in frequency and intensity until the peak is reached in early or middle March.

During January and February the male appears indifferent to the trilling and posturing of his mate. He pays no special attention to her other than to forage with

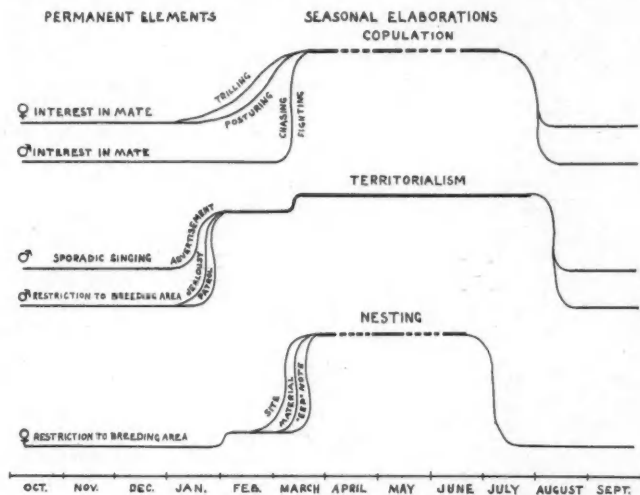


Fig. 28. Relation of permanent and seasonal elements of behavior.

her and utter location notes as he has done throughout fall and winter. From early March on, however, the male punctuates long periods of indifference by what I interpret as unsuccessful attempts to copulate. Quite suddenly, without any warning that I can detect, his attitude of indifference changes to one of aggression. He chases his mate and, on catching up with her, apparently attempts to mount her. She repulses him and the two birds jab each other with their beaks. After a few moments they separate and the male resumes his air of indifference. Apparently the female is not yet ready to mate, although she may trill and posture both before and after the "fight." By mid-March, some six or eight weeks after the beginning of trilling, the instincts of both birds synchronize. The female follows her mate persistently, trilling and posturing vigorously. He responds by flying to her with crown raised and tail lowered and slightly spread. She permits him to mount and copulation takes place.

The highest development of territorialism is expressed normally only in the male. He makes himself conspicuous by loud, persistent singing. He patrols his area, that is, he flies from one tree to another on the periphery and stops at each perch to sing. If a neighboring male attempts to come in, which happens rarely during actual breeding time, the owner flies toward the intruder and chases it to the boundary. Here he stops, perches in a conspicuous place and sings several loud songs. The intruder may also perch in full view and alternate with the defending male in loud singing. The permanent substrata of territorial behavior are restriction to the breeding area and

song. The less permanent elements are increased and seemingly purposeful song or "advertisement," territorial jealousy, and patrol. Hints of these can be detected early in spring. The climax is reached about nine weeks later, usually on the first day the female begins to incubate.

I had an exceptionally good chance to watch the coming of these elements in January, 1936. On the morning of January 4, I heard one of my banded birds, male VIII, singing every few seconds. I found him perched conspicuously in a bare tree on the east side of his territory. He showed no fear of me even when I stopped within six feet of him, but faced me and continued to sing for several seconds. The singing itself was not new. During winter I had often heard Nuttalls sing as loudly if not as many times in succession. It was the fact that this male perched in a conspicuous place and continued to sing while I stood so near, that foreshadowed a change. On January 7, I heard him sing again several times in rapid succession. This time I found him perched on top of a low hedge in the western part of his area. He flew a few yards to a cotoneaster by the lawn where the day before he had tolerated, and foraged with, two immatures. Today, however, when an immature tried to perch in the same bush, male VIII immediately drove it out. This set him off to sing again, alternating in utterance with male I, his neighbor on the north.

Two days later I watched male I go through the same performance in an even more striking way. All winter he had tolerated within his area a group of eight to ten immature Nuttalls. On the morning of January 9, I saw him perched on a bare sycamore with about seven of the immatures. He sang loudly several times, then stopped to preen the feathers of his breast and flanks. Suddenly he started to chase two of the immatures which had been perched within a few inches of him. I soon lost sight of all three, but I heard a cry as if male I had caught up with one of the immatures and attacked it. A few moments later the whole flock, including male I and his mate, were foraging peaceably on the lawn. Then I heard a weak quavering song from a Nuttall perched in a tall pyracantha several yards north. Immediately male I flew to this tree, displaced the singer, and himself sang, loudly. The displaced bird continued to perch on another branch of the same tree only a foot away from male I. As the latter shifted his position from one twig to another, the other bird always gave way before him, although male I never actually chased it. Then suddenly male I flew straight toward me across a wide lawn and over to a tall cedar, where he sang again. As he continued to sing I heard several immature Nuttalls sing fragments of songs, but he did not chase any of them again that morning as long as I watched.

These actions exhibited hints of all the elements of territorial behavior: advertisement by loud singing, territorial jealousy by chasing other birds, and patrol by flying to three conspicuous perches many yards apart and singing loudly from each one. For some time after, these instincts came and went. Fits of territorial jealousy were interspersed with periods of apparent indifference, when male I foraged peaceably with the flock, or even permitted another male to perch near him in the same tree and sing. After January 26 the instincts of territorial behavior remained on a "plateau," as is usual at about this time. There was little chasing, since the immatures had segregated into pairs each on its own area. There was also less loud singing. On the first day of incubation, the territorial behavior suddenly rose to a new climax. Male I sang loudly every few seconds, and patrolled his area. The instinct to chase was present but rarely exercised because encroachments upon the boundaries were rare.

It must not be understood that territorial behavior is peculiar to the male. The same instincts are latent in the female, but are overtly expressed only in cases of polygamy, which are common. The development of the territorial sense in the female

independently of the male is illustrated in the behavior of females I and III, simultaneous mates of male I. In winter both females made free of their common mate's territory, though with some tendency to localization, as discussed below. With the approach of reproduction, however, each female created for herself a subdivision of the main territory which she defended *against the other female* by loud singing and fighting, and in which she finally chose her nest-site. From February 1 until late March, by which time both had nests, each female sang frequently from a favorite perch within her section. The two alternated in utterance, as do neighboring males. Twice, when female III followed the male toward the section which belonged to female I, a fight ensued between the two females. They locked feet and jabbed each other on the breast. Then they separated, and female III flew back to her section, while female I sang. Had they not been banded, I should have thought I was watching a boundary dispute between two males.

Nest-building, like copulation and the highest development of territorialism, involves synchronization of successively emergent elements. I watched female I closely during February and March, 1935, to see how early she would begin to pick up straws, utter notes associated with nest-building, or visit the future nest-site. It may have been merely a coincidence that on February 10, as I passed by the oriental thuja which was later to serve as her nest-site, I saw female I fly out from this tree. But her subsequent behavior attracted my attention. She acted as she had so often the previous spring, when I visited her nest to examine and weigh the young birds. She flew only five or six feet away from the thuja, perched in full view on a cotoneaster twig, and uttered a series of strident alarm notes. This was not the typical reaction of a startled bird, which seeks refuge in dense foliage and rarely utters more than one or two "eep's." Female I distinctly registered protest rather than fright. The suggestion is strong that she had special interest in the thuja as early as February 10.

On March 10, I saw her pick up nest material for the first time. She was hopping about on the ground underneath the same tree. She pecked at dried leaves, picked one up, dropped it. On March 13, I heard her utter a series of sharp "eep's." This note is ordinarily given by the female Nuttall as she approaches the nest-site with nest-material in her beak. On this day, however, female I, while giving the note, merely perched near the thuja without any nest-material in her beak. Again she protested as she saw me approach the thuja. On March 15, I watched her pick up a small piece of paper and a strand of dead grass, fly with these to a perch on a twig of cotoneaster within a foot of the thuja, and there utter a series of "eep's." Again she failed to enter the tree, but remained perched on the cotoneaster holding the straw and paper in her beak. Within a few minutes she flew to the ground and dropped the material. The instincts to pick up nest-material, fly toward the nest-site, and utter notes associated with nest-building were all present, but apparently had not yet been synchronized into an effective procedure.

Two days later, on March 17, I saw her approach the thuja with straws in her beak, uttering loud "eep's" just before she entered. But even on this day she did not work continuously. She made a few visits to the nest-site, and then ceased working altogether. Twice on March 18 I saw her approach the thuja with straws in her beak, only to drop the material without entering the tree. On the following day, March 19, the instincts related to nesting became synchronized at last into coordinated activity, and she began continuous work on the nest. By March 25 the nest appeared complete, although it is possible that female I added more material to the lining after this date. On March 31, forty-nine days after female I had first showed concern at my approach to the thuja, the first egg was laid.

We can only speculate as to whether nest-building, like copulation and territorial behavior, has a permanent substratum. The case already mentioned where females I and III showed a cumulative interest in small sections of their mate's territory in which the nest-sites were finally chosen, suggests the possibility. In 1934 the breeding area of male I included the lawns and shrubbery between the Life Sciences Building and California Hall, as well as the narrow lawns on the south sides of both buildings. During fall and winter each female was seen occasionally in almost every part of this area, but female I was found more often in the northeastern part, by the flag-pole in front of California Hall, while female III was seen more frequently in the southeast part, by the lawn south and southwest of California Hall. The broad lawn in front of the Life Sciences Building which comprised the west half of the territory was only rarely visited by either female. A certain amount of restriction within the male's area was apparent, then, even in winter. This became more marked from early February on, when I noticed that female I stayed almost entirely within an area surrounding the flag-pole about 30 yards square, near the center of which stood the small thuja where she had built a nest the year before. Female III, on the other hand, stayed in an adjacent part, the southern corner of the lawn south of California Hall. At the edge of this lawn was a clump of *raphiolepis* bushes and a small tree in which female III frequently perched. In mid-March, when female I started to build her nest, she chose the thuja as the nest-site. Female III started to build in late March, and put her nest in the clump of *raphiolepis* bushes.

I do not mean to imply that as early as February 1, the birds had begun to take interest in possible nesting places conceived as such. I simply want to point out that from the beginning there was substantial segregation of the two females to subdivisions, that with the advance of the season each female restricted her activities more and more, and that later when she started to build her nest, she chose a tree or bush within this section.

I have described a few outstanding elements of breeding behavior. There are undoubtedly many others, shading back no one can say how far, emerging or intensifying no one can say how gradually or in response to how distant threshold conditions. A great deal has been discovered or rediscovered and emphasized in the last twenty years in the field of behavior, yet in minute and coherent observation we are merely beginning. Adequate observation, unfortunately, demands an almost prohibitive amount of time, not only in numbers of hours but in numbers of seasons and years, with small assurance of significant results.

Museum of Vertebrate Zoology, Berkeley, California, April 4, 1936.

STEPS IN THE DEVELOPMENT OF THE BIRD-FLOWER

By A. L. PICKENS

Again red leads, with purple as a lagging second, in this the second list of bird-visited flowers (see Condor, vol. 33, 1931, pp. 23-28). Pink, orange, blue, yellow, white, green and maroon follow in descending order of avian choice as indicated by this and preceding investigations. Figworts, mints, peas, lilies, and composites are in order the five favorite families of flowers as so far indicated.

While assembling the new list of avian flowers, over seven hundred associations between flowers and insects have been recorded. Maroon or brownish flowers show the highest proportion of associations with insects of primitive or unspecialized mouth-

parts; then come white, green, yellow, pink, blue, orange, purple and red in order of association with insects of increasing complexity or specialization of mouth-parts. This in general reverses the order of avian choice of color, and is very significant, since red has not always been regarded as the highest advance in floral color, although it is the complement of the ancestral green. The natural relation of red, purple, blue, green, yellow, orange, and the maroon or brown they combine to form is thus shown graphically by the initials of each:

	R	
O		P
	M	
Y		B
	G	

J. M. Breazeale in "Color Schemes of Cacti" (University of Arizona, 1930, p. 5) says of the law of color, "The law did not originate with the artist, but with Nature, and it became a law on account of its origin." Apparently, then, flowers in evolving should show some relation, in the color evolution, to this color-wheel. Green, it would seem, should first evolve into yellow, maroon and blue. Even without insect aid the wind-pollinated pines and junipers show yellow and brown in the proto-flowers, and the yellow of pollen-masses may well have been the lure to a food supply for the first pollinating insects, say beetles. Thus blue, the other color component of green, must have been handicapped, not only by its lack of contrast with the ancestral green, but by the early getaway made by the showy, though usual, color of pollen. If primitive eyes see only in shades of gray, certain whites might have brightness survival-value over the duller primitive yellows. Again, increase of red in the green would lead to maroon or brown shades. Perhaps the hemipterous bugs would be drawn to these tender shoots that produced flowers since they were punctured more readily for sap-sucking. Flies might well follow for the excess leakage, and then wasps, first to catch the congregating insects and later to partake of the oozing fluids. Thus perhaps nectar evolved. Maroon, so nearly like torn flesh in color, would appeal to flesh-flies, especially as corresponding odors were developed.

The recorded seven hundred associations between Nearctic insects and flowers indicate today that maroon, white, greenish and yellow flowers are primitive in the appeal to insects, drawing strongly on beetles, bugs, flies and wasps and their allies. Once symbiosis was established, mutual specialization followed. Whites developed as we may suppose into pinks, maroons into purples; bees developed, small primitive short-tongued, and though lured by the primitive colors they also favored pinks and purples. Larger, long-tongued bees developed, and though favoring several colors, they raised purple and blue flowers to high favor.

Pink appeals about equally to primitive and specialized pollinators; but orange, purple, and red make in ascending order an appeal to more specialized pollinators. The rise in importance of butterflies as red increases is strikingly shown in these observations. Third in choice with blues and pinks, second with purple and orange, with the reds they stand first as insect visitors. Day-loving butterflies favor long wave lengths; cranny-loving bees short ones, and thus the red and blue in the purple flowers meet two forces that tend to lead in opposite directions. Blue is thus a more advanced color than purple, but we recall the tendency of the eye to see red and green as a pair and yellow and blue as another pair. Apparently primitive, yellow-perceiving insects, also able to perceive the blue which they failed to develop, are setting upon these blues and leading them to primitive shapes to appeal to primitive short tongues. The larger bees have helped develop most admirable pollination mechanisms among the purples,

and yet rival the flies in favoring flowers of a rather primitive greenish. *Polygonum* is not only greenish; it actually seems to be hidden beneath the foliage. Perhaps some greenish, and some of the purple, flowers among dark almost blackish foliage are perceived by means of eyes that make use of the ultra-violet rays. Certainly some bee-flowers like *Dalea*, *Lobelia*, *Polygonum*, and *Nabalus* affect those settings and shades we find used in fluorescent exhibits. But bright reds and greens of plants by ultra-violet appear inconspicuous or even blackish, while yellows, blues and whites show to advantage.

In Otto Porsch's "Grellrot als Vogelblumenfarben" (Biologia Generalis, vol. 7, 1931, pp. 647 ff) we get some interesting suggestions. While certain bees perhaps see ultra-violet they fail to see the long waves of red, and the reds that birds favor are probably black or gray to the bees. While Europe is rich in red berries such as might lure berry-eating birds, it lacks flower-visiting birds and is markedly poor in bright red flowers. To further emphasize the dependence of our reds on the avian influence I might add that in teaching on the Atlantic slope, on the Pacific, and in the upper Mississippi Valley, I have found one can rather safely predict a speedy return of migrant hummingbirds when he finds a tubular red flower blooming in the wild. Had the Cherokees known how gulf sage, Cherokee bean, coral honeysuckle, and Virginia fire-pink succeed one the other before the spring advance of the Ruby-throat, they might have woven about it some of the lore attached to the Cardinal, alleged daughter of that Sun to whom red was sacred, even had they never seen the little midget stretch in the sun on a modern sidewalk or other bare area. But surprising as it seems at first, red not only lures hummingbirds, but tends to protect from certain insect eyes like those of bees, Porsch suggesting it may even appear black or gray to such. I have been interested in testing the showiness of certain greenish and red flower forms by ultra-violet light. The results at times are surprising. Coral honeysuckle (*Lonicera sempervirens*), cross-vine (*Bignonia capreolata*), Solomon's seal (*Polygonatum commutatum*), jack-in-the-pulpit (*Arisaema triphyllum*) and green dragon-root (*A. Dracontium*) were placed in ultra-violet light on a slaty-black background. The first was almost invisible; the second despite its yellow spots was almost as obscure. The green dragon was a very green example but appeared plainer than either. The leaf of the jack was almost black, but the spathe showed fairly well, while the normally inconspicuous flowers of *Polygonatum* were now conspicuous above all the others. The fact that real green and red tend to make an obscure pair, and violet and yellow a conspicuous pair by ultra-violet light recalls similar phenomena observed in the study of color-blindness. (See W. H. Howell's "Text-book of Physiology," 1933.)

Here is an interesting field for ornithophily. And are not crimson pea (*Lathyrus splendens*), scarlet loco (*Astragalus coccinea*), western azalea (*Rhododendron occidentale*), pink honeysuckle (*Lonicera hispidula*), bell phacelia (*Phacelia whittlavia*), fire-cracker (*Brodiaea coccinea*) and thistle sage (*Salvia carduacea*) being neglected? I believe these are surely visited by hummingbirds, or even specialized for them. The old genus *Mimulus*, with blue, pink, scarlet, salmon and golden forms, must afford a striking study in the evolution of the ornithophilic from the insect flower. This is a rare combination of color when we recall that the rule of DeCandolle limited many families to red-orange-yellow and to red-purple-blue combinations, even allowing now an additional blue-violet and yellow grouping joined by an intermediate maroon or brown as in the iris and violet genera. We must beware of rule-of-thumb methods. Hummingbirds, like bees, in the absence of favorites visit poverty-flowers and flowers of less-favored colors. Our finds as to insects are offered as suggestions only. Thousands of such observations might shed some light on the evolution of floral color, a story the colorless and almost absent fossil flowers leave intriguingly neglected.

In the list here presented, "Test" indicates mere trial visit; "Insects" a visit to a flower for insects by birds. Others appear to be for nectar.

- Polygonaceae. Silver Lace Vine. White; rose; green. *Polygonum auberti*. Test.
 Amaranthaceae. Cock's-comb. Red. *Celosia cristata*.
 Cactaceae. Drink Cactus. Yellow. *Echinocactus cylindraceus*.
 Euphorbiaceae. Summer Poinsettia. Red. *Euphorbia heterophylla*.
 Lauraceae. Avocado. Greenish. *Persea americana*.
 Avocado. Greenish. *Persea drymifolia*.
 Ranunculaceae. Dwarf Larkspur. Blue. *Delphinium tricornis*.
 Papaveraceae. Flanders Poppy. Red. *Papaver Rhoeas*. Test.
 Plume Poppy. Pinkish. *Bocconia cordata*.
 Bleeding Heart. Pink. *Dicentra spectabilis*.
 Cruciferae. Siberian Wall-flower. Orange. *Cheiranthus allioni*.
 Squaw Cabbage. Purple. *Sireptanthus inflatus*.
 Crassulaceae. *Crassula* spp. Red.
Echeveria spp. Red; orange.
Dudleya lanceolata. Orange; red.
 American Orpine. Pale Pink. *Sedum telephoides*.
 Rosaceae. Almond. Pink. *Prunus amygdalus*.
 Peach. Pink. *Persica vulgaris*.
 Leguminosae. Goat's Rue. In red stage. *Cracca hispidula*. Test.
 Everlasting Pea. Pink; white. *Lathyrus latifolia*.
 Pea-vine Clover. Red-purple. *Trifolium pratense*.
 Pink Clover. Pink. *Trifolium repens*.
 Texas Mountain Laurel. Purple. *Sophora secundiflora*.
 Wild Sweet Pea. Lilac. *Bradburya virginiana*.
 Butterfly Pea. Lilac. *Clitorea mariana*.
 Bush Clover. Violet-purple. *Lespedeza virginica*.
 Pole Bean. White and yellow. *Phaseolus vulgaris* var.
 Western Locust. Pale rose. *Robinia Neo-Mexicana* (?).
 Common Locust. White. *Robinia pseudacacia*.
 Punicaceae. Pomegranate. Scarlet. *Punica granatum*.
 Onagraceae. Wild Primrose. Yellow. *Oenothera biennis*.
 Primrose Honeysuckle. White to red. *Gaura Drummondii*.
 Malvaceae. Texas Fuchsia. Vermilion. *Malvaviscus Drummondii*.
 Tree Mallow. Purple-rose. *Malva sylvestris*.
 Sapindaceae. Red Texas Buckeye. Red. *Aesculus discolor* (?).
 Pink Texas Buckeye. Pink. *Ungnadia speciosa* (?).
 Balsaminaceae. Pale Jewel-weed. Yellow. *Impatiens pallida*.
 Convolvulaceae. Palmate Cypress-vine. Red. *Quamoclit quamoclit* × *hederifolia* (?).
 Texas Morning-glory. Lavender. *Ipomea trifida*.
 Ivy-leaf Morning-glory. Blue. *Ipomea hederaceae*.
 Polemoniaceae. Standing or "Tree" Cypress. Red. *Gilia coronopifolia*.
 Blue Gilia. Blue. *Gilia capitata*.
 Boraginaceae. Geiger Tree. Scarlet, or orange. *Cordia sebestena* (?).
Achusa sp. Blue; purple.
 Chinese Forget-me-not. Blue. *Cynoglossum amabilis*.
 Solanaceae. Red Tobacco. Red. *Nicotiana forgetiana*.
 Snow-berried Cestrum. Yellow. *Cestrum* sp.
 Horse Nettle. White. *Solanum carolinense*. Test.
 Scrophulariaceae. Scarlet Bugler. Red. *Pentstemon centranthifolius*.
 Paint Brush. Red. *Castilleja oblongifolia*.
 Turtle-head. Pink and White. *Chelone glabra*.
 Veronica. Lilac; blue. *Veronica longifolia*.
 Spiked Veronica. Blue. *Veronica spicata*.
Torenia Fournieri. Blue and violet.
 Slipper-flower. Yellow and brown. *Calceolaria crenatiflora*.
 Fern-leaved False Foxglove. Yellow. *Dasystoma pedicularia*.
 Great Tree Trumpet; Empress Tree. White. *Paulownia Fortunei*. Test perhaps.
 Acanthaceae. "Justicia." Red. *Jacobinia carnea*.
 Beloperone. Red, white, and purple. *Beloperone guttata*.

- Labiatae. Hemp-nettle. Red. *Galeopsis ladanum*.
 Columbian Salvia. Scarlet. *Salvia gesneraeifolia*.
 Tree Salvia. Red. *Salvia arborea*.
 Gulf-coast Wild Sage. Red. *Salvia coccinea*.
 Wild Sage. Blue. *Salvia azurea*.
 Wild Sage. Blue. *Salvia farinacea*.
 Showy Dragon-head. Purple. *Dracocephalum speciosum*.
 Bee Balm. Purple. *Monarda fistulosa*.
 Desert Sage. Purple and blue. *Ramona incana*.
 Verbenaceae. Verbena. Pink. *Verbena* sp. or hybrid.
 Loganiaceae. Maryland Pink-root. Red. *Spigelia marilandica*.
 Apocynaceae. Madagascar Periwinkle. Rose. *Vinca rosea*.
 Myrtle Vine Periwinkle. Blue. *Vinca major*.
 Asclepiadaceae. Purple Milkweed. Magenta. *Asclepias purpurascens*.
 Rubiaceae. *Manettia glabra*. Red.
 Snowy Portlandia. White. *Portlandia platantha* (?).
 Caprifoliaceae. Bush Honeysuckle. Yellow. *Diervillea lonicera*.
 Lobeliaceae. Cardinal flower. Red. *Lobelia hybrida*.
 Campanulaceae. Bell Flower. Blue or white. *Campanula persicifolia*.
 Dipsacaceae. Mourning Bride. Purple, rose. *Scabiosa atropurpurea*.
 Ambrosiaceae. Giant Ragweed. Green. *Ambrosia trifida*. For insects.
 Compositae. New England Aster. Violet-purple. *Aster novae-angliae*.
 Globe Thistle. Blue. *Echinops ritro*.
 Golden Coreopsis. Orange. *Coreopsis tinctoria*.
 Veldt Marigold. Orange. *Venidium decurrens*. Test.
 Straw-flower. Orange. *Helichrysum bracteatum*. Test.
 Small-head Sunflower. Yellow. *Helianthus microcephalus*. Insects.
 Artichoke. Yellow. *Helianthus tuberosus*.
 Leaf-cup. Yellow. *Polymnia uvularia*.
 Clammy Weed. Whitish. *Polisia graveolus*.
 Boneset. White. *Eupatorium perfoliatum*.
 Araceae. Calla Lily. White. *Zantedeschia aethiopica*. Test.
 Liliaceae. New Zealand Flax. Maroon. *Phorimum tenax*.
 Showy Lily. Rosy white. *Lilium speciosum rubrum*.
 Red-hot Poker. Orangeaceous. *Kniphofia uvaria*.
 Showy Lily. Orange. *Lilium henryi*.
 Canada Lily. Yellow. *Lilium canadense*.
 Madonna Lily. White. *Lilium candidum*.
 African Lily, albino. White. *Agapanthus umbellatus*.
 Star-of-Bethlehem. White. *Ornithogalum umbellatum*.
 California Hyacinth. Purple. *Brodiaea capitata*, etc.
 Aloes spp. Probably some new forms here in red, orange, and yellow.
 Amaryllidaceae. Orange Mescal. Deep Yellow. *Agave parryi* (?).
 Iridaceae. *Watsonia coccinea*. Red.
 Blackberry lily. Orange. *Belamcanda chinensis*.
 German Iris. Purple. *Iris germanica*.
 Leafy Blue Flag. Blue. *Iris foliosa*.
 Commelinaceae. Day-flower. Blue. *Commelina communis*.

Mrs. Lura P. Garrison of South Carolina, Mrs. Jack Hagar of Texas, Miss Kate Roads of Ohio, Professor Aretas Saunders of Connecticut, and Mr. Robert S. Woods of California have continued their former valuable aid in the preparation of this second list. Doctors Alfred Rehder of the Arnold Arboretum and S. F. Blake and C. V. Morton of the U. S. National Museum have aided greatly in determining some of the more difficult exotics.

Paducah Junior College, Paducah, Kentucky, May 12, 1936.

HARRY SCHELWALD SWARTH

WITH THREE ILLUSTRATIONS

By JEAN M. LINSDALE

Wherever the Cooper Ornithological Club is discussed one of the names surely to be mentioned is Harry Swarth. This may result from the eminence of the man as a student of western birds, from the many services he rendered to the Cooper Club, or from his widespread friendship with naturalists everywhere. Whatever the nature of the benefit we as members of the Club received from association with him, it is fitting that we record in this magazine a résumé of his activities and especially some mention of the material contributions he made to the study of birds.

Swarth's interest in natural history was aroused and fostered by his early close association with George Frean Morcom. This relation which amounted almost to kinship was of mutual advantage and long duration. It has been related in detail in Swarth's biographical account of Morcom (*Condor*, vol. 36, 1934, pp. 16-24). Because of its significance some of that story has been extracted and is repeated here in order to give basis for interpretation of many later events in Swarth's life. Incidentally it reveals how the influence of one naturalist may extend on to reach persons of succeeding generations and more or less control their activities.

This story, then, will commence with the year 1870. Swarth related that "soon after Mr. Morcom settled in Chicago there occurred the great fire of 1871 that destroyed most of the city. He had already become acquainted with the families of Ernst and Auguste Swarth, and with them fled northward, to camp in the cemetery that later became Lincoln Park. From that time on they dwelt together. At different periods two houses were occupied, both adjoining Lincoln Park, and in each Mr. Morcom occupied the uppermost story. He was building up his collections during these years, both of birds and eggs, and the bulky cabinets took much space."

The birth of Harry Schelwald Swarth on January 26, 1878, in Chicago, thus came several years after an active center of interest in natural history had been established in the household. Even if his parents, Corrinne Themmen and Ernst Adriaan Swarth, had planned Harry's career they doubtless could not have moulded it so well as it was done by a person really outside the family.

The Swarth families and Morcom spent the winter of 1885-1886 in Los Angeles and they established permanent residence there in 1891. They settled at the western edge of the then quiet town where the land was mostly in grain fields interspersed with deserted cement sidewalks, rows of shade trees, empty houses, and unused railroad tracks—the remains of a period of too enthusiastic real estate development in the '80's. The environment was ideal for making a naturalist. Swarth himself wrote of it: "I could not remember a time when I had not had the run of rooms where bird skins and birds' eggs were being handled; I had always had available books about natural history, and, altogether, to investigate animal life, particularly birds, seemed not merely obvious but the inevitable course of existence." He learned to make birdskins in order to help Morcom and together they explored the rich surrounding area for birds.

The daily program, followed faithfully for years, was crowded with activities that make up the training of a naturalist. A hunt each morning took two hours before breakfast and school time. The resulting specimens were examined and skinned after school in the afternoon. The intimate acquaintance with the birds of the region gained by actually stalking, and then handling examples, was supplemented by an extensive shelf full of the best reference books of that time. The keys, descriptions, and pictures were as important in this training as the extensive experience in the field.



Fig. 29. Harry Schelwald Swarth, 1878-1935.

Industrious tramping over the varied collecting grounds in the Los Angeles area soon made the Morcom collection rather complete for that district and attention was directed to a more distant field. In 1895, with the advice of Major Bendire the Huachuca Mountains, Arizona, were selected as the most promising section for exploration. Swarth, then seventeen years old, along with O. W. Howard, W. B. Judson, and H. G. Rising, started in the spring from Los Angeles and drove with a team and wagon across the desert. They were in the field from February 29 to July 20. The experiences of this first extensive field trip impressed Swarth in many ways and he mentioned them frequently in later years; especially did he contrast those early conditions of the landscape and travel with the ones which replaced them in the 1930's.

By 1904 it was plain that ornithology would remain Swarth's occupation, and plans were made to join some museum. Through the help of Morcom he became assistant in the Department of Zoology in the Field Columbian Museum, Chicago. There was no opportunity to work in California, for at that time natural history museums were scarce in this country. This marked the close of the first major division of Swarth's life, when he was so closely associated with Morcom and influenced by him. However, that influence was so great that it lasted for all the rest of his life.

At the Field Museum, Swarth worked for Professor Charles B. Cory and although he had some opportunity to collect birds, at Fox Lake, Illinois, in the summer of 1905 and in Will County in the summers of 1906 and 1907, and he was in friendly surroundings, the whole situation was different from what his long preparation demanded. He was therefore considerably elated when, in the spring of 1908, an invitation came from Joseph Grinnell to return to California and join the staff of the Museum of Vertebrate Zoology, shortly after that institution was founded. He began as an Assistant Curator, and from 1910 he was Curator of Birds, except for an interval (1913 to 1916) as Assistant Director, Museum of History, Science and Art, Los Angeles, until 1927, when he became Curator, Department of Mammalogy and Ornithology, California Academy of Sciences. He held this position at the time of his death.

At Berkeley, Swarth found compelling incentive to exercise the talents which he had been so long developing. His major, and almost sole, interest in natural history then was in the study of geographic distribution and variation in the birds of western North America. The area had been explored just enough to show where concentrated studies would be profitable. For many years after its establishment the Museum was seriously working along this line in that region and Swarth's part in the work was a large one. He not only made long trips into the field in remote districts, but between trips he worked with the growing collection, handling and identifying the skins. Thus, he enriched his already full knowledge of the characters of western birds.

Soon he became interested in certain genera or sections of genera which had aroused special difficulties in identification. Clearer understanding of these troublesome groups involved long study of specimens from many parts of the ranges of the birds. Among these monographic studies which constituted an exceptional type of combined philosophic and systematic bird work, papers dealing with the following groups of birds were issued in the decade beginning in 1913.

Spotted towhees	1913
Canada geese	1913
Rock wrens	1914
Bush-tits	1914
Bewick wrens	1916
White-fronted geese	1917
California jays	1918
Brown towhees	1918
Fox sparrows	1920
Song sparrows (part)	1923

Although naturalists generally came to appreciate long ago the high value of the type of work represented in the studies listed above, it is doubtful if they realized the full extent of the preparation involved in those studies. Some inkling of it comes when we recall that Swarth had already published work in faunal and systematic zoology for fifteen years before the first of these revisions appeared and that that first one was his seventieth paper. It is not surprising that later he was sometimes emphatic in urging that ability, exactitude, and patience be displayed more often in systematic bird work.

Another measure of the subject matter of these revisions is supplied by the following list of new forms of birds discovered and described by Swarth. The names are arranged chronologically in order to show the trend of interest and activity of this systematic worker. The total is not high, but a high proportion have found approval by other workers.

<i>Pipilo maculatus montanus</i>	1905 Arizona
<i>Strix occidentalis huachucae</i>	1910 Arizona
<i>Otus asio gilmani</i>	1910 Arizona
<i>Dryobates villosus sitkensis</i>	1911 Alaska
<i>Pipilo maculatus falcinellus</i>	1913 California
<i>Salpinctes guadeloupensis proximus</i>	1914 Lower California
<i>Telmatoedus palustris aestuarinus</i>	1917 California
<i>Aphelocoma californica oocleptica</i>	1918 California
<i>Passerella iliaca mariposae</i>	1918 California
<i>Passerella iliaca fulva</i>	1918 California
<i>Passerella iliaca canescens</i>	1918 California
<i>Dendragapus obscurus sitkensis</i>	1921 Alaska
<i>Spizella tavernei</i>	1925 British Columbia (with A. Brooks)
<i>Pipilo maculatus umbraticola</i>	1926 Lower California (with Grinnell)
<i>Pipilo fuscus petulans</i>	1926 California (with Grinnell)
<i>Pipilo fuscus bullatus</i>	1926 Oregon (with Grinnell)
<i>Balanosphyra formicivora martirensis</i>	1926 Lower California (with Grinnell)
<i>Penthestes gambeli atratus</i>	1926 Lower California (with Grinnell)
<i>Baeolophus inornatus affabilis</i>	1926 Lower California (with Grinnell)
<i>Baeolophus inornatus sequestratus</i>	1926 Oregon (with Grinnell)
<i>Psaltiriparus minimus melanurus</i>	1926 Lower California (with Grinnell)
<i>Chamaea fasciata canicauda</i>	1926 Lower California (with Grinnell)
<i>Lagopus lagopus alascensis</i>	1926 Alaska
<i>Cactospiza giffordi</i>	1929 Galapagos
<i>Camarhynchus conjunctus</i>	1929 Galapagos
<i>Camarhynchus aureus</i>	1929 Galapagos
<i>Dendragapus obscurus pallidus</i>	1931 Oregon
<i>Nesomimus parvulus wenmani</i>	1931 Galapagos
<i>Geospiza septentrionalis nigrescens</i>	1931 Galapagos
<i>Cactospiza pallida striatipecta</i>	1931 Galapagos

Although mammals came second in his interest, Swarth made important contributions to our knowledge of them in the west. At least twelve of his papers dealt wholly or in part with mammals and he discovered new kinds, as follows:

<i>Eutamias phaeus</i>	1911 Alaska
<i>Microtus coronarius</i>	1911 Alaska
<i>Ursus americanus pugnax</i>	1911 Alaska
<i>Marmota flaviventris</i>	1911 British Columbia
<i>Marmota flaviventris</i>	1911 Alaska
<i>Scapanus latimanus occultus</i>	1912 California (with Grinnell)
<i>Thomomys jacintus</i>	1914 California (with Grinnell)
<i>Sciurus hudsonicus picatus</i>	1921 Alaska
<i>Dipodomys merriami olivaceus</i>	1929 Arizona
<i>Lemmus haroldi</i>	1931 Alaska
<i>Microtus mordax littoralis</i>	1933 Alaska

Of all his undertakings, Swarth's revision of the fox sparrows (*Passerella iliaca*) was no doubt the most difficult. At the same time, it stands out not only among his own reports, but in general systematic ornithology as a model of organization, clear presentation, and significant interpretation. This publication is probably the best example among his writings of his ability to simplify a complicated problem and then to present it in a logically consistent and concise manner. This is apparent at the first

examination, and long study confirms the early impression. The hand-written manuscript in early stages has been preserved and it is remarkably like the final printed copy in organization and arrangement, thus demonstrating that the pleasing appearance is not merely the result of meticulous editorial care, but it comes from thorough mastery of the situation before writing was begun.

Unlike those naturalists whose field experiences end when they undertake serious museum studies, Swarth was able to continue work in the field through his whole life. His explorations and field study were thorough in four distinct regions—California, Arizona, northwest coast of North America, and the Galapagos Islands. Interest was



Fig. 30. Swarth preparing specimens in camp in the Sierra Nevada at Hume, Fresno County, California, August 21, 1916.

aroused in the order here indicated, and it was maintained continuously in each area for many years. He worked in many localities in California, especially in the southern part of the state from 1894 to 1916. The most important paper resulting from this work was the one published in 1913, with Dr. Grinnell, on the birds and mammals of the San Jacinto area. I valued greatly the privilege which came to me to go with Mr. Swarth on my first field trip to the mountains of California, on a search for *Passerella*, in 1926, and this happened to be his last collecting expedition in the State. It is hard to say which was most impressive—his remarkably accurate recognition of the plumages of certain birds we encountered, or his patience in withstanding, with meager camping equipment, an exceptionally stormy May in the north coast ranges.

An early interest in Arizona resulted in trips to that state in 1896, 1902, 1903, 1907, 1917, and 1927; and, although the list of bird workers in the area has been a long one, Swarth remained the authority on Arizona birds. After 1914, especially, his distributional list for that state was looked to as the guide for Arizona bird work.

Next, he acquired an interest in the northwest coastal region of North America and soon became one of the leaders in the faunal analysis of that puzzling district. His visits in 1898, 1909, 1910, 1919, 1921, 1924, 1929, 1931, and 1934 covered the whole span of his activity in the field, and they provided basis for several faunal reports as well as his contribution to a general distributional account of the birds of British Columbia. This appeared as number 17 of the Pacific Coast Avifauna series and was prepared in collaboration with Major Allan Brooks.

Still another district attracted Swarth's attention, and he spent most of the last ten years of his life thinking of the peculiar bird problems centering around the Galapagos Islands. When he went to work at the California Academy of Sciences in 1927, one of the main enticements was the opportunity to study the land birds from those islands in the collection, which had never been studied critically. Soon after the publication of his report on this material, in 1931, an opportunity came for him to visit the islands. He was in charge of the scientific staff of the Templeton Crocker Expedition of the California Academy of Sciences, 1932, which visited the Galapagos, and there he saw in life many of the peculiarities of the fauna that had been so impressively suggested in the preserved material. Many new specimens were obtained and extensive notes were recorded. These were the foundations for an elaborate account of the avifauna of this archipelago, which he was planning to bring to completion for publication. Another important result of this trip was the conviction that the animals and plants on these islands required some special protection if they were to be preserved in proper manner. Swarth was active in keeping this question alive until some favorable action was induced.

Reviews formed a prominent part of Swarth's writings; no fewer than sixty-four, nearly thirty per cent of all his papers, were reviews. In his case reviews were not merely casual acknowledgments of receipt of papers, but they were conscientious attempts to analyze and appraise each article. He felt that he got more out of the reviews he wrote than did anyone else, because the writing made him study carefully many papers that he might otherwise have skimmed over pretty hastily. He once said that it was so hard in reviewing to mention, without giving undue prominence, relatively unimportant defects in a generally excellent paper, that he hated to be thoroughly critical. Also he tried to keep in mind that it had seldom happened that a reviewer had appreciated certain features of his own papers over which he spent the most time and pains and which seemed to him of greatest importance.

In his Cooper Club History (1929) Swarth included mention of his own connection with the Club in the same vein as his comments on other members. There he recalls that after the "Southern California Natural History Society" had passed away he "attended meetings of the Southern Division of the Cooper Club for a year or more with fair regularity before mustering up courage to ask if the Club would accept membership dues from him." His account continues: "Not only was this privilege cheerfully granted, but within a few months he was elected treasurer of the Division. He can point with pride to the fact that it was during his regime that the Club took the momentous step of increasing dues from \$1.00 to \$1.25, this in connection with the launching of the 'Bulletin.' Other offices came to him without seeking—offices laborious rather than ornamental. He was 'secretary, pro-tem.' with such monotonous regularity that he was finally left undisturbed in that position for many years, alternately in the Northern and Southern Divisions. At last, in 1922, he was elected president of the Northern Division, and as such he was so successful that he was enthusiastically made an ex-president the following year."

This understatement reveals little of the real nature of his many services to the

Club and the important part he had in guiding its affairs through its whole history. In the seventeen years he was Associate Editor of *The Condor*, the hours he spent in correcting manuscripts, reading proofs, and preparing indexes made a huge total. His widespread acquaintance among the membership brought many opportunities to help solve questions which continually arise for naturalists. His interest and concern for the welfare of the Cooper Club were never diminished and in late years he often



Fig. 31. Swarth in the field at timberline on Doch-da-on Creek, British Columbia, July 23, 1919.

discussed the problems which came with increase in membership and the shift in interest from that of a few active collectors to that of a large group of enthusiastic bird watchers. He was constantly in search of a way to make the Club beneficial to all types of bird students and especially to retain the participation of the more advanced ones.

A life so continuously filled with thought and attainment as Swarth's, participates in much more than can be included here and accomplishes more than this brief summary can even suggest. Swarth resolved early to reserve part of his energy for other interests than the systematic study of birds and he sought especially an acquaintance with English literature and acquired an intimate knowledge of the work of many

writers. He delighted to discover a counterpart in life of some character found in his reading and he saw many current incidents as they had been described long before. His trip to England and western Europe, in 1930, although mainly for studying type specimens from the Galapagos, in the British Museum, brought many opportunities for greater acquaintance with English customs which always had attracted him.

This account has been concerned mostly with activities which reached large numbers of people because the results of them were printed, but by the persons who knew Swarth he was valued for many qualities not revealed in that work. His interest in other naturalists, especially beginners, is appreciated by many individuals who profited from his genuine concern for their welfare. He rarely made ambitious promises, but whenever he discovered that one of his acquaintances was in need of some particular bit of equipment that he could supply, that need was likely soon to be filled. Sometimes this required much planning and effort, but once started on such an errand, he persisted until it was accomplished.

Even though Swarth was often away on a long trip, or else preparing for a new trip, he invariably liked to be at home. After his marriage in October, 1910, to Winifern Wood, a permanent home was established in Berkeley where it was maintained except for a short stay in southern California, which was really only a prolonged visit to a former dwelling place. Their two sons, George Selwyn and Morton Themmen, were reared in Berkeley, but the whole family took part in some zoological exploration at various places from Arizona to Alaska. Mrs. Swarth, in 1920, contributed to a publication on the birds of Grand Canyon.

It was on one of the visits by the family to Atlin, British Columbia, in 1934, that Swarth became seriously ill. Although he made slow progress toward recovery, he continued to study and to write at home when not at his office in San Francisco. His material accomplishments ceased when he died quickly on the morning of October 22, 1935, but his influence will persist so long as people study birds in western North America.

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52. Review of "The Ward-McIlhenny wildfowl refuge," by Charles Willis Ward. *Condor*, vol. 13, pp. 213-214.
53. Description of a new hairy woodpecker from southeastern Alaska. *Univ. Calif. Publ. Zool.*, vol. 7, pp. 313-318.
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54. A visit to Nootka Sound. *Condor*, vol. 14, pp. 15-21, 4 figs.
55. Review of F. L. Burns' "A monograph of the broad-winged hawk (*Buteo platypterus*)."
Condor, vol. 14, p. 44.

56. Report on a collection of birds and mammals from Vancouver Island. Univ. Calif. Publ. Zool., vol. 10, pp. 1-124, pls. 1-4.
57. The winter range of the Yakutat song sparrow. Condor, vol. 14, p. 73.
58. [with J. Grinnell] The mole of southern California. Univ. Calif. Publ. Zool., vol. 10, pp. 131-136, 2 figs.
59. [with J. Grinnell] *Myotis orinomus* Elliot, a bat new to California. Univ. Calif. Publ. Zool., vol. 10, pp. 137-142, 2 figs.
60. Differences due to sex in the black swift. Auk, vol. 29, pp. 241-242.
61. On the alleged egg-carrying habit of the band-tailed pigeon. Auk, vol. 29, pp. 540-541.
62. Review of Oberholser's "A revision of the subspecies of the green heron (*Butorides virescens* [Linnaeus])." Condor, vol. 14, p. 231.
63. Review of Gardner's "A partial account of the birds in the vicinity of Laguna Beach." Condor, vol. 14, p. 231.

1913

64. The supposed occurrence of the blue goose in California. Condor, vol. 15, p. 43.
65. Review of Oberholser's "A revision of the forms of the great blue heron (*Ardea herodias* Linnaeus)." Condor, vol. 15, pp. 50-51.
66. William Leon Dawson—A biography. Condor, vol. 15, pp. 62-69, 4 figs.
67. Review of Riley's "Birds collected or observed on the expedition of the Alpine Club of Canada to Jasper Park, Yellowhead Pass, and Mount Robson region." Condor, vol. 15, pp. 130-131.
68. [with J. Grinnell] An account of the birds and mammals of the San Jacinto area of southern California, with remarks upon the behavior of geographic races on the margins of their habitats. Univ. Calif. Publ. Zool., vol. 10, pp. 197-406, pls. 6-10.
69. The status of Lloyd's bush-tit as a bird of Arizona. Auk, vol. 30, pp. 399-401.
70. A revision of the California forms of *Pipilo maculatus* Swainson; with description of a new subspecies. Condor, vol. 15, pp. 167-175, 1 fig. (map).
71. Note on the Guadalupe caracara. Condor, vol. 15, pp. 228-229.
72. Review of W. E. Clyde Todd's "A revision of the genus *Chaemepelia*." Condor, vol. 15, p. 231.
73. Review of Bailey's "Life zones and crop zones of New Mexico." Condor, vol. 15, p. 232.
74. A study of a collection of geese of the *Branta canadensis* group from the San Joaquin Valley, California. Univ. Calif. Publ. Zool., vol. 12, pp. 1-24, 2 pls., 8 figs.

1914

75. Unusual plumage of the female linnet. Condor, vol. 16, p. 94.
76. Review of Sage and Bishop's "The birds of Connecticut." Condor, vol. 16, p. 97.
77. Review of Bryant's "A determination of the economic status of the western meadowlark (*Sturnella neglecta*) in California." Condor, vol. 16, pp. 149-150.
78. Review of Oberholser's "Four new birds from Newfoundland." Condor, vol. 16, p. 151.
79. Early arrival of the ash-throated flycatcher in the San Diego district. Condor, vol. 16, p. 183.
80. Review of Oberholser's "Monograph of the genus *Chordeiles* Swainson." Condor, vol. 16, pp. 189-190.
81. A study of the status of certain island forms of the genus *Salpinctes*. Condor, vol. 16, pp. 211-217.
82. The California forms of the genus *Psaltiriparus*. Auk, vol. 31, pp. 499-526, 1 pl. (map).
83. A distributional list of the birds of Arizona. Pac. Coast Avifauna No. 10, pp. 1-133, 1 pl. (map).
84. [with J. Grinnell] The pocket gopher of the Boreal Zone on San Jacinto Peak. Proc. Calif. Acad. Sci., 4th ser., vol. 4, pp. 153-160.

1915

85. Albinism in the English sparrow. Science, n. s. vol. 41, p. 578.
86. Guide to the exhibit of fossil animals from Rancho La Brea. Los Angeles County Museum of History, Science and Art, Dept. Nat. Sci., Misc. Publ. no. 1, pp. 1-34, 1 pl., 19 figs.
87. The status of the Arizona spotted owl. Condor, vol. 17, pp. 15-19.
88. An apparent hybrid between species of the genera *Spatula* and *Querquedula*. Condor, vol. 17, pp. 115-118, 1 fig.
89. Review of E. M. Anderson's "Report on birds collected and observed during April, May, and June, 1913, in the Okanagan Valley, from Okanagan Landing south to Osoyoos Lake," and "Birds collected and observed in the Atlin district, 1914," and F. Kermod's and E. M. Anderson's "Report of birds collected and observed during September, 1913, on Atlin Lake, from Atlin to south end of the lake." Condor, vol. 17, pp. 133-134.
90. California screech owl in the Humboldt Bay region. Condor, vol. 17, p. 167.
91. Scissor-tailed flycatcher in southern California. Condor, vol. 17, p. 203.
92. Western gull and Arctic tern: Corrections of records. Condor, vol. 17, pp. 205-206.
93. Review of J. Grinnell's "A distributional list of the birds of California." Condor, vol. 17, pp. 237-239.

1916

94. Townsend solitaire in the San Jacinto Mountains. Condor, vol. 18, pp. 32-33.
95. The Pacific coast races of the Bewick wren. Proc. Calif. Acad. Sci., 4th ser., vol. 6, pp. 53-85, pl. 2 (map).
96. The broad-tailed hummingbird in California. Condor, vol. 18, p. 130.
97. The Sahuaro screech owl as a recognizable race. Condor, vol. 18, pp. 163-165.

1917

98. Geographical variation in *Sphyrapicus thyroideus*. Condor, vol. 19, pp. 62-65.
99. A revision of the marsh wrens of California. Auk, vol. 34, pp. 308-318, 1 fig. (map).
100. Observations on some Fresno County birds. Condor, vol. 19, pp. 129-130.
101. Review of A. T. Wayne's "A list of avian species for which the type locality is South Carolina." Condor, vol. 19, p. 146.
102. [with H. C. Bryant] A study of the races of the white-fronted goose (*Anser albifrons*) occurring in California. Univ. Calif. Publ. Zool., vol. 17, pp. 209-222, 1 pl., 2 figs. in text.

1918

103. Notes on some birds from central Arizona. Condor, vol. 20, pp. 20-24.
104. Review of "Report of field-work in Okanagan and Shuswap districts, 1916" by J. A. Munro. Condor, vol. 20, p. 48.
105. The Pacific coast jays of the genus *Aphelocoma*. Univ. Calif. Publ. Zool., vol. 17, pp. 405-422, 1 fig. in text (map).
106. The subspecies of the Oregon jay. Condor, vol. 20, pp. 83-84.
107. Review of F. M. Chapman's "The distribution of bird-life in Colombia." Condor, vol. 20, pp. 95-97.
108. The distribution of the subspecies of the brown towhee (*Pipilo crissalis*). Condor, vol. 20, pp. 117-121, 2 figs. in text.
109. Review of P. A. Taverner and R. M. Anderson's "Divisional reports," in "Summary report of the Geological Survey, Department of Mines, for the calendar year 1916" (Ottawa). Condor, vol. 20, pp. 141-142.
110. Review of J. Dwight's "The geographic distribution of color and of other variable characters in the genus Junco: a new aspect of specific and subspecific values." Condor, vol. 20, pp. 142-143.
111. Review of C. B. Cory's "Catalogue of birds of the Americas and the adjacent islands in the Field Museum of Natural History." Condor, vol. 20, pp. 143-144.
112. Three new subspecies of *Passerella iliaca*. Proc. Biol. Soc. Wash., vol. 31, pp. 161-164.

1919

113. [with J. Dixon] Some Sierran chipmunks, with notes on photography of small mammals. Sierra Club Bull., vol. 10, pp. 401-413, pls. ccxxiii-ccxxv.
114. Review of P. A. Taverner's "The hawks of the Canadian prairie provinces in their relation to agriculture." Condor, vol. 21, p. 46.
115. A California specimen of the sandhill crane. Condor, vol. 21, pp. 212-213.

1920

116. Bohemian waxwing in southeastern California. Condor, vol. 22, p. 72.
117. Gulls following a train. Condor, vol. 22, p. 75.
118. [with Winifern W. Swarth] Some winter birds at the Grand Canyon, Arizona. Condor, vol. 22, pp. 79-80.
119. Review of H. C. Oberholser's "A revision of the subspecies of *Passerculus rostratus* (Cassin)." Condor, vol. 22, pp. 81, 84.
120. The subspecies of *Branta canadensis* (Linnaeus). Auk, vol. 37, pp. 268-272.
121. In memoriam: Frank Slater Daggett. Condor, vol. 22, pp. 129-135, 1 fig.
122. Revision of the avian genus *Passerella*, with special reference to the distribution and migration of the races in California. Univ. Calif. Publ. Zool., vol. 21, pp. 75-224, pls. 4-7, 30 text figs.
123. Birds of the Papago Saguaro National Monument and the neighboring region, Arizona. U. S. Dept. Interior, National Park Service, 63 pp., 8 pls., 1 fig. (map).

1921

124. Fables and fallacies of ornithology. The Gull, vol. 3, no. 3.
125. The Sitkan race of the dusky grouse. Condor, vol. 23, pp. 59-60.
126. The red squirrel of the Sitkan district, Alaska. Journ. Mammalogy, vol. 2, pp. 92-94.
127. *Bubo virginianus occidentalis* in California. Condor, vol. 23, p. 136.
128. The type locality of *Crotalus willardi* Meek. Copeia, no. 100, p. 83.
129. Review of B. W. Evermann and H. W. Clark's "Lake Maxinkuckee, a physical and biological survey." Condor, vol. 23, p. 142.

1922

130. Review of B. W. Evermann's "Notes on the birds of Carroll, Monroe, and Vigo counties, Indiana." Wilson Bull., vol. 34, p. 47.
131. Birds and mammals of the Stikine River region of northern British Columbia and southeastern Alaska. Univ. Calif. Publ. Zool., vol. 24, pp. 125-314, pl. 8, 34 text figs.
132. The Bohemian waxwing: a cosmopolite. Univ. Calif. Chronicle, vol. 24, no. 4, pp. 450-455, col. pl.
133. Review of R. C. McGregor and Elizabeth J. Marshall's "Philippine birds for boys and girls." Condor, vol. 24, p. 139.

1923

134. Review of A. C. Bent's "Life histories of North American petrels and pelicans and their allies." Condor, vol. 25, p. 35.
135. Review of B. T. Gault's "A check list of the birds of Illinois." Condor, vol. 25, p. 73.
136. The systematic status of some northwestern song sparrows. Condor, vol. 25, pp. 214-223, 1 fig. (map).

1924

137. Birds and mammals of the Skeena River region of northern British Columbia. Univ. Calif. Publ. Zool., vol. 24, pp. 315-394, pls. 9-11, 1 fig. in text.
138. Sexual variation in *Nephoecetes niger*. Auk, vol. 41, pp. 383-384.
139. Fall migration notes from the San Francisco Mountain region, Arizona. Condor, vol. 26, pp. 183-190, 2 text figs.
140. White wing-markings in the Heermann gull: a record from the past. Condor, vol. 26, p. 192.
141. Notes upon certain summer occurrences of the gray flycatcher. Condor, vol. 26, pp. 195-197.
142. [with F. B. Sumner] The supposed effects of the color tone of the background upon the coat color of mammals. Journ. Mammalogy, vol. 5, pp. 81-113, pls. 6-12.

1925

143. [with Allan Brooks] The timberline sparrow, a new species from northwestern Canada. Condor, vol. 27, pp. 67-69.
144. Review of H. Kirke Swann's "A monograph of the birds of prey." Condor, vol. 27, pp. 85-86.
145. Review of A. C. Bent's "Life histories of North American wild fowl. Order Anseres (Part)." Condor, vol. 27, pp. 213-214.
146. Review of Wyman and Burnell's "Field book of birds of the southwestern United States." Condor, vol. 27, p. 242.
147. A visit to the Stikine glaciers. Sierra Club Bull., vol. 12, pp. 121-125, pls. 41-43.
148. [with Allan Brooks] A distributional list of the birds of British Columbia. Pac. Coast Avifauna No. 17, 158 pp., 2 pls., 38 text figs.

1926

149. Northern Say phoebe in California. Condor, vol. 28, pp. 45-46.
150. The Audubon's warbler. The National Association of Audubon Societies: Educational Leaflet No. 126. Bird-Lore, vol. 28, pp. 82-84.
151. Gulls feeding on star-fish. Condor, vol. 28, pp. 97-98.
152. [with J. Grinnell] An additional subspecies of spotted towhee from Lower California. Condor, vol. 28, pp. 130-133, 2 text figs.
153. Review of W.E. Wait's "Manual of the birds of Ceylon." Condor, vol. 28, pp. 136-137.
154. [with J. Grinnell] Systematic review of the Pacific Coast brown towhees. Univ. Calif. Publ. Zool., vol. 21, pp. 427-433, 2 text figs.
155. [with J. Grinnell] A new race of acorn-storing woodpecker, from Lower California. Condor, vol. 28, pp. 176-178, 1 text fig.
156. [with J. Grinnell] New subspecies of birds (*Penthestes*, *Baeolophus*, *Psaltiriparus*, *Chamaea*) from the Pacific Coast of North America. Univ. Calif. Publ. Zool., vol. 30, pp. 163-175, 2 text figs.
157. Report on a collection of birds and mammals from the Atlin region, northern British Columbia. Univ. Calif. Publ. Zool., vol. 30, pp. 51-162, pls. 4-8, 11 text figs.
158. James Hepburn, a little known Californian ornithologist. Condor, vol. 28, pp. 249-253.
159. [with J. Grinnell] Geographic variation in *Spizella atrogularis*. Auk, vol. 43, pp. 475-478.

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160. Review of P. A. Taverner's "Birds of Western Canada." Condor, vol. 29, pp. 84-85.
161. Review of "Checklist of the birds of Australia." Condor, vol. 29, pp. 129-130.
162. Valley quail imported from Chile. Condor, vol. 29, p. 164.
163. Birds of the Atlin region, British Columbia: A reply to criticism. Condor, vol. 29, pp. 169-170.
164. The rufous-necked sandpiper on St. Paul, Pribilof Islands. Condor, vol. 29, pp. 200-201.
165. Eversmann shrike not a North American bird. Condor, vol. 29, p. 205.
166. The rufous-necked sandpiper in Alaska. Condor, vol. 29, p. 274.

1928

167. Winter birds of California highways. *National Motorist*, vol. 4, no. 9, pp. 6, 23-24, 1 text fig.
168. Winter occurrence of Sierra Nevada rosy finch and black rosy finch in California. *Condor*, vol. 30, p. 191.
169. Review of Taverner's "A study of *Buteo borealis*, the red-tailed hawk, and its varieties in Canada." *Condor*, vol. 30, pp. 197-199.
170. Occurrence of some Asiatic birds in Alaska. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 17, pp. 247-251.
171. A bush-tit's nest on a pedestal. *Condor*, vol. 30, pp. 359-360, 1 text fig.
172. Annual Report, Department of Ornithology and Mammalogy. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 16, pp. 743-745.

1929

173. [Editorial comment upon plumage sequences.] *Condor*, vol. 31, p. 40.
174. The meeting of the American Ornithologists' Union at Charleston, S. C., November 20-22, 1928. *Condor*, vol. 31, pp. 41-42.
175. A new bird family (Geospizidae) from the Galapagos Islands. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 18, no. 2, pp. 29-43, 6 text figs.
176. Birds on the bay. *The Gull*, vol. 11, no. 2.
177. [with L. H. Miller and W. P. Taylor] Some winter birds at Tucson, Arizona. *Condor*, vol. 31, pp. 76-77.
178. Review of Mrs. F. M. Bailey's "Birds of New Mexico." *Condor*, vol. 31, pp. 82-83.
179. The faunal areas of southern Arizona: A study in animal distribution. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 18, pp. 267-383, pls. 27-32, 7 text figs.
180. The C. O. C. 1893-1928. A systematic study of the Cooper Ornithological Club. Published at the fourth annual meeting of the Cooper Ornithological Club, San Francisco, May 17, 1929. Pp. 1-78, many text figs.

1930

181. Notes on the Avifauna of the Atlin region, British Columbia. *Condor*, vol. 32, pp. 216-217.
182. Annual Report, Department of Ornithology and Mammalogy, for 1929. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 18, pp. 556-558.
183. Nesting of the timberline sparrow. *Condor*, vol. 32, pp. 255-257, 1 text fig.
184. [Biographical notice of] Frank Aleman Leach. *Auk*, vol. 47, pp. 308-309.

1931

185. Review of H. C. Oberholser's "Notes on a collection of birds from Arizona and New Mexico." *Condor*, vol. 33, pp. 81-82.
186. Geographic variation in the Richardson grouse. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 20, pp. 1-7, 3 text figs.
187. The avifauna of the Galapagos Islands. *Occas. Papers, Calif. Acad. Sci.*, vol. 18, pp. 1-299, 1 pl. (map), 57 text figs.
188. The tyranny of the trinomial. *Condor*, vol. 33, pp. 160-162.
189. Black-footed albatross on San Francisco Bay. *Condor*, vol. 33, pp. 214-215.
190. The lemming of Nunivak Island, Alaska. *Proc. Biol. Soc. Wash.*, vol. 44, pp. 101-104.
191. Annual report, Department of Ornithology and Mammalogy for 1930. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 19, pp. 441-447.

1932

192. Review of Fisher and Wetmore's "Report on birds recorded by the Pinchot Expedition of 1929 to the Caribbean and Pacific." *Condor*, vol. 34, pp. 55-57.
193. Status of the Baikal teal in California. *Condor*, vol. 34, p. 259.
194. [Biographical notice of] George Frean Morcom. *Auk*, vol. 49, pp. 519-520.

1933

195. Off-shore migrants over the Pacific. *Condor*, vol. 35, pp. 39-41.
196. Review of van Rossem's "Descriptions of new birds from the mountains of southern Nevada," Taverner's "A partial study of the Canadian Savanna sparrows [etc.]," and Oberholser's "Descriptions of new birds from Oregon, chiefly from the Warner Valley region." *Condor*, vol. 35, pp. 43-45.
197. Frigate-birds of the west American coast. *Condor*, vol. 35, pp. 148-150, 1 text fig.
198. [Editorial: Governmental reorganization in Manila.] *Condor*, vol. 35, p. 169.
199. Exposicion relacionada con la creacion de un refugio en el Archipiélago de Galapagos para su flora y su fauna. *Annales de la Universidad Central, Quito, Ecuador*, tomo 50, no. 284, pp. 633-641.
200. Relationships of Coues and olive-sided flycatchers. *Condor*, vol. 35, pp. 200-201.

201. The long-tailed meadow-mouse of southeastern Alaska. *Proc. Biol. Soc. Wash.*, vol. 46, pp. 207-212.
 202. Peale falcon in California. *Condor*, vol. 35, pp. 233-234.
 203. The Savannah sparrows of northwestern North America. *Condor*, vol. 35, pp. 243-245.
- 1934
204. In Memoriam: George Frean Morcom, March 16, 1845-March 25, 1932. *Condor*, vol. 36, pp. 16-24, fig. (photo).
 205. Problems in the classification of northwestern horned owls. *Condor*, vol. 36, pp. 38-40.
 206. The ten-year index to "The Auk." *Auk*, vol. 51, pp. 126-128.
 207. Bush-tit fighting its reflection. *Condor*, vol. 36, pp. 87-88.
 208. A criticism of certain "new" subspecies. *Condor*, vol. 36, p. 90.
 209. Birds of Nunivak Island, Alaska. *Pac. Coast Avifauna* No. 22, pp. 1-64, 4 figs.
 210. The bird fauna of the Galapagos Islands in relation to species formation. *Biological Reviews* [Cambridge, England], vol. 9, no. 2, pp. 213-234, figs.
 211. [H. S. Swarth, editor] Ten-year index to *The Auk*, volumes 38-47—1921-1930, pp. i-xxiii + 1-328.
- 1935
212. Review of D. M. Gorsuch's "Life history of the Gambel quail in Arizona." *Condor*, vol. 37, pp. 45-46.
 213. A barn swallow's nest on a moving train. *Condor*, vol. 37, pp. 84-85, fig.
 214. Review of E. R. Hall's "Mammals collected by T. T. and E. B. McCabe in the Bowron Lake region of British Columbia." *Canadian Field-Naturalist*, vol. 49, pp. 77-78.
 215. Injury-feigning in nesting birds. *Auk*, vol. 52, pp. 352-354.
 216. Systematic status of some northwestern birds. *Condor*, vol. 37, pp. 199-204.
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217. Savannah sparrow migration routes in the northwest. *Condor*, vol. 38, pp. 30-32, 1 fig.
 218. An early estimate of California's fauna. *Condor*, vol. 38, pp. 38-39.
 219. A list of the birds of the Atlin region, British Columbia. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 23, pp. 35-58.
 220. Origins of the fauna of the Sitkan district, Alaska. *Proc. Calif. Acad. Sci.*, 4th ser., vol. 23, pp. 59-71, 1 fig.

Museum of Vertebrate Zoology, University of California, Berkeley, May 11, 1936.

FROM FIELD AND STUDY

Feeding Habits of the Snowy Egret.—The Snowy Egret (*Egretta thula*) is a clever bird, for he is able to adapt his fishing methods to time and tide. When fishing in the shallow pools of a mudflat he employs stealth. He approaches the pool with care and caution; deliberately he lifts his feet; deliberately he puts his feet down. A successful stalk brings him to the edge of the pool without disturbing his intended victim. His head is held forward on his long stretched neck. He now presents a picture of poised alertness. He is prepared to strike, but there is no movement in the pool. Now he reaches forward with one foot and gently pats the surface of the pool. His light touch starts a fish without muddying the water. Like a flash he strikes and then with a careless toss of his head his victim is sent to a new resting place.

On January 28, 1936, at Bolsa Chica Slough a Snowy Egret was seen employing an entirely different method to get himself some lunch. He was fishing in one of the main arms of the slough and in order to insure success he must somehow contrive to get the fish into water not more than four or five inches deep. He knew the answer to this problem. His method was to walk along the mud bank at the edge of the slough until he had located a school of small fish and then, flying out over the water, he would approach from behind and by flapping his wings wildly he would herd the fish toward the shore into shallow water. This maneuver was remindful of a woman shoeing flies out of the house by waving a dish-towel.

When the fish were in fairly shallow water the Egret dropped to his feet and became amazingly active, striking whenever within reach of a fish, leaping upward, leaping from side to side, fanning his wings, all efforts to keep the fish headed for the shore. This weirdly grotesque dance continued until the last fish had been taken or had escaped to sea. And to make the hunting dance more spectacular every movement of the snow-white bird was reflected in the dark still waters of the slough.—CHAS. W. MICHAEL, *Pasadena, California, February 13, 1936.*

A Broken Wing Heals.—During banding operations at my Woodacre station on March 1, 1936, a Golden-crowned Sparrow "repeat," number 84161715, managed to snap the humerus of its right wing in trying to escape. A large brush pile is maintained close to where the feed hopper and some of the traps are located, the pile being large enough to form a good hiding place where birds cannot be reached by hawks or stray cats; so the injured bird was gently placed on an inner twig half way up the side of the pile.

On March 15, just two weeks after its accident, this bird reappeared in one of the traps. On being released after its number was read, instead of fluttering back to the brush pile close by, it flew to a thick-set live oak tree some 40 or 50 feet away, and furthermore it flew upward some 20 feet from the ground. It seemed to fly a trifle more slowly than usual, but its action showed that the bone had knit and that the wing was fulfilling its function. Moral: for ground-feeding birds always have a brush pile handy in case of accidents, where the victim can hop down from twig to twig and feed without straining the injured wing. Fortunately such an accident is of rare occurrence.

—JOSEPH MAILLIARD, *California Academy of Sciences, San Francisco, April 8, 1936.*

Surf Scoter in the Cuyamaca Mountains, California.—On March 24, 1936, I was in the Cuyamaca Mountains near Julian, San Diego County, California. While driving down the grade toward the desert, I saw a male Surf Scoter (*Melanitta perspicillata*) sitting in the road. The bird did not seem to be injured, but rather tired out. It ran along the ground, but we succeeded in capturing him before he was able to take off. We had had a high wind all day, with rain and snow in the mountains. The altitude here is about 4000 feet. There are records of this duck from a number of inland localities; nevertheless, the discovery of this one some 50 miles from salt water seems worthy of record.—ED N. HARRISON, *Encinitas, California, May 5, 1936.*

Some Observations on the Food of the Prairie Falcon.—Pellets were collected and examined at two nesting sites of Prairie Falcon (*Falco mexicanus*). Subspecific and some specific names of animals represented in them are based on known distribution (at the Kern County eyrie through trapping and shooting) of the forms rather than on direct identification. Questionable identifications are so marked.

Eyrie in southern Kern County: 41 pellets, all exclusively mammal remains:

9 *Citellus mohavensis*

26 *Ammospermophilus leucurus leucurus*

6 *Neotoma lepida lepida*

At the nest site was found a half-eaten and still fresh *Citellus mohavensis*, and just below it old bones (last year's?) of a young but nearly full-sized *Lepus californicus deserticola*, and fresh feathers (but no corresponding pellet) of a Northern Cactus Wren (*Heleodytes brunneicapillus couesi*). The old birds were seen 12 or 15 times over a two-weeks period carrying *Ammospermophilus* to their young.

Eyrie in east-central San Luis Obispo County: 30 pellets, 20 containing (17 mainly or exclusively) mammal, 11 (10 mainly or exclusively) bird, 1 exclusively reptile, 6 (2 mainly) insect remains:

Citellus beecheyi (fisheri?) in 8 pellets

Ammospermophilus nelsoni nelsoni in 7 pellets

hair, almost certainly *Ammospermophilus* in 2 pellets

hair (*Onychomys?*) in 2 pellets

Otocoris alpestris, subsp. ? in 6 pellets

feathers, probably *Otocoris*, in 1 pellet

Sturnella neglecta? in 2 pellets

Carpodacus mexicanus frontalis in 2 pellets

lizard (*Sceloporus*) in 1 pellet

grasshoppers (all *Oedipodinae?*) in 5 pellets

large beetle (*Carabidae?*) in 1 pellet

A young decapitated and plucked Horned Lark was in the nest with the young falcons.

At an eyrie in western Kern County a female was flushed from the eggs and was joined in the air by the male. A pair of Barn Owls (*Tyto alba pratincta*) flew from the same cliff. The female Prairie Falcon broke the wing of the female owl, and the male falcon killed the male owl outright, each with a single stoop. This eyrie was later revisited, and 4 dead young were found—1 in the nest and 3 below it. It is assumed that picnickers shot the parents.

At an eyrie in southwestern San Luis Obispo County was found a fresh half-eaten wild cat (*Lynx rufus californicus*) kitten, the estimated live weight of which was slightly over 2 pounds, or

about the load limit of a female Prairie Falcon. There is no proof that the kitten was killed by a falcon (it was on a ledge about 30 feet from the nest), but a rather extensive exploration of the cliff disclosed no signs of other large birds of prey.—RICHARD M. BOND, *Oakland, California, December 3, 1935.*

A Note on the Nesting of the Bush-tit.—On May 22, 1935, when on a short trip to the Argus Mountains in Inyo County, California, a nest of the Lead-colored Bush-tit was found about dusk in a dense atriplex bush near the road in Mountain Springs Cañon. When I shook the bush preparatory to investigating the nest, a brood of young (estimated at 7 or 8) swarmed out and escaped to near-by brush. I did not further investigate at the time, but the following morning four young, just able to fly, left the nest as I approached. Thinking the nest to be now useless to the family I removed it with the object of investigating the "species content" of the feathers which entered into the nest's construction.

Much to my surprise there were five perfectly fresh, unsoiled eggs, which without question represented a second laying for the season. The first of these must have been laid for some days prior to the time the first brood was ready to leave. Such "overlapping" of broods, with the young of one brood acting as temporary incubating agents for the eggs of the second, was entirely new to my experience. When, recently, I mentioned the circumstance to Mrs. Joseph Grinnell, she said she believed that similar occurrences might be the answer to the extremely short time intervals which had elapsed between the first and second broods of certain pairs of bush-tits observed by her in the San Francisco Bay region.

The systematic status of the Argus Mountain bush-tits cannot be stated definitely at this time, since no specimens were taken. However, the birds observed were unquestionably of the "lead-colored" type, and probably (see van Rossem, *Auk*, vol. 53, 1936, p. 85) belong to the subspecies *Psaltiriparus minimus cecamenorum*.—A. J. VAN ROSSEM, *San Diego Society of Natural History, San Diego, California, April 3, 1936.*

Hummingbirds of Southwestern Saskatchewan.—Hummingbirds are not seen frequently in this section of Saskatchewan. But during the last 20 years, with increased settlement and with great extension of flower-growing everywhere, these little birds have either increased in numbers, or there are more people to see them.

Formerly it was believed that the only species of hummingbird occurring on the plains was the Ruby-throated (*Archilochus colubris*); but recent discoveries show that at least three members of the family may be found here. A hummingbird was found by a neighbor on his farm near Eastend in August, 1925. It was in an exhausted state and died next day. Sent to the Provincial Museum at Regina the bird was identified as a Ruby-throated.

After a heavy rainstorm, a hummingbird was picked up dead in Eastend on August 11, 1929. At Regina this was found to be a Rufous Hummingbird (*Selasphorus rufus*), previously unknown to occur east of the Alberta foothills. Another hummingbird, dead and badly decomposed, was found in Eastend on August 18, 1932. This specimen is preserved in the local Museum at Shaunavon, 25 miles east of Eastend, and is believed to be a Rufous. Mr. C. F. Holmes, a naturalist friend near Shaunavon, found a dead hummingbird on his farm on July 31, 1933. We are satisfied that this also is of the same species.

A hummingbird taken in a Shaunavon garden on August 22, 1935, was forwarded by Mr. Holmes to the National Museum, Ottawa. The specimen was identified by Taverner as a Calliope Hummingbird (*Stellula calliope*) and becomes the first record of the third species to be found in the Province.

It will be noted that with one exception, all the records extant are for birds found dead or dying, in or close to August, and it is not unlikely that inclement weather at that time of year may prove fatal to numbers of these tiny creatures. Nearly all definite dates of live hummingbirds seen are for August or September. Mr. Steve Mann, whose farm lies 30 miles north, on the northern slope of the Cypress Hills, tells me he has seen hummingbirds in his garden on May 12 and 13, 1932, and June 3, 1933. He states that he has never seen more than one bird at any time, and has seen no evidence of nesting.

The discovery of these two new species, both mountain dwellers, is less surprising when it is pointed out that our Cypress Hills rise to a level of 3600 to 4000 feet. In Montana, which is less than 40 miles to the south, the Ruby-throated Hummingbird is believed not to occur, whereas four other species, which include the Rufous and Calliope, are to be found in the State (Pac. Coast Avifauna No. 14, 1921, pp. 82-84). Further collecting, therefore, may prove these two, and not the Ruby-throated, to be the prevalent species in this locality.—LAURENCE B. POTTER, *Gower Ranch, Eastend, Saskatchewan, April 14, 1936.*

New Bird Records for Arizona.—Records in Arizona of the following birds, with two exceptions, are based upon specimens in the collection of the Museum of Northern Arizona, Flagstaff. Specimens have been identified by Dr. J. Grinnell, Dr. A. H. Miller, and Mr. T. T. McCabe at the Museum of Vertebrate Zoology, Berkeley, California, and by Dr. A. Wetmore, Smithsonian Institution, Washington, D. C.

Horned Grebe (*Colymbus auritus*). A mounted grebe in the Dean Eldredge Museum, 5 miles east of Flagstaff, has been identified as of this species by Wetmore. This bird was shot by Eldredge on Marshall Lake, 12 miles south of Flagstaff, in the fall of 1926. The first record is from the same general region (Hargrave, Condor, vol. 35, 1933, p. 75).

Northern Phalarope (*Lobipes lobatus*). Merriam found a flock of eight on Walker Lake, near Flagstaff, August 19, 1889 (Merriam, N. Am. Fauna, no. 3, 1890, p. 88). On August 14, 1932, I saw several individuals on Ashurst Lake, 25 miles south of Flagstaff. Allan R. Phillips took a Northern Phalarope, Z8.517, on Mormon Lake, 30 miles south of Flagstaff, on August 31, 1934, when six were seen. He also saw a single individual at the same lake on September 7, 1933. Also, there is a specimen, MNA 3533, taken by Lewis D. Yaeger on September 21, 1932, near Anita, Coconino County, on the railroad between Williams and Grand Canyon.

Forster Tern (*Sterna forsteri*). Swarth (Pac. Coast Avif. No. 10, 1914, p. 10) records an adult male taken May 4, 1910, at the mouth of the Gila River. McCabe has identified as this species an immature female, Z8.220, shot on Mormon Lake, September 23, 1933, by H. S. Perkins and prepared by J. W. Brewer, Jr.

Common Tern (*Sterna hirundo*). First recorded by Henshaw (Report upon Ornithological Specimens Collected in the Years 1871, 1872, and 1873, Washington, 1874, p. 147), who took one on September 3, 1873 (not 1872). September 23, 1933, Perkins shot an adult male, Z8.221, on Mormon Lake. Identified by McCabe. Perkins said terns were common and that he had noted them for several days previous. Terns of the *forsteri-hirundo* group have been seen on this lake August 31, 1934, by H. N. Russell, Jr. and September 4, 7, and 9, 1933, by Phillips. All were in adult plumage.

Pacific Nighthawk (*Chordeiles minor hesperis*). Oberholser reports three specimens (U.S.N.M., Bull. 50, Pt. 6, 1914, p. 57). Three nighthawks taken by me in 1932 have been identified as of the race *hesperis* by Miller. These birds were taken at the lower edge of the pine forest (Transition Zone) at an elevation of about 7200 feet on the northwest slope of San Francisco Peak and about 18 miles from Flagstaff. Two adult males, MNA 3315-3316, were taken at Jack Smiths Tank, June 1 and 4, respectively. An adult female, 3314, from Medicine Valley, was taken June 10. One bird, 3313, taken June 1, with *hesperis* 3315, has been identified by Miller as *C. m. henryi*.

Also, taken the same year are four adult males and two females identified by Miller as intergrades between *henryi* and *hesperis*, characters of *henryi* predominating. These are: 3312, June 1, Jack Smiths Tank; 3513, June 16, and 3515, June 27, Deadmans Flat; 3516, July 15, Deadmans Wash; 3517, August 5, Turkey Tanks; and 3518, August 8, Merriam Crater. With the exception of 3312, all were taken in Upper Sonoran forest.

Eastern Kingbird (*Tyrannus tyrannus*). Although there are no known Arizona specimens of this bird, Anderson (Condor, vol. 36, 1934, pp. 79-80) has admitted it to the state list on the authority of Mrs. F. M. Bailey. A single individual was seen by me on June 13, 1933, at the Wetherill-Colville Guest Ranch, Kayenta, Navajo County. Although I was not permitted to collect the bird, I did have ample opportunity to examine it from a short distance with 6-power binoculars. Several qualified observers independently identified the bird. It was not seen in mid-July when I returned.

Eastern Phoebe (*Sayornis phoebe*). Recorded by Kimball (Condor, vol. 23, 1921, p. 57) from the Chiricahua Mountains. Curiously, the third specimen and second record for the State was taken on the same day as was the first specimen, October 8, but 15 years later, in 1933. This specimen, Z8.196, was collected by Yaeger while we were working a slough along Salt River near Blue Point, Maricopa County. Only one individual was seen. Identified by McCabe.

Monterey Hermit Thrush (*Hylocichla guttata slevini*). Swarth secured four specimens in the Huachuca Mountains (Pac. Coast Avif. No. 4, 1904, p. 64). March 26, 1932, I took an adult female, 3403, at Sahuaro Lake, Maricopa County. Identified by McCabe.

Northwestern Shrike (*Lanius borealis invictus*). The first Arizona record is a bird taken by Coues at Fort Whipple, Prescott, in February, 1865. Seventy-one years later, January 7, 1936, Mr. Victor R. Kießling caught one in a government sparrow trap with seven juncos. The juncos were dead, the heads of each having been pierced, but only one, a Red-backed Junco, had been partly eaten. This shrike, Z8.547, an adult female, was taken at Coyote Range, Flagstaff, in the Transition Zone at an elevation of about 7100 feet. Identification checked by Grinnell. Shrikes have occasionally been seen in Transition and lower Canadian zones in the San Francisco Mountains during winter.

Red-eyed Vireo (*Vireo olivaceus*). One specimen was secured by Lusk in the Huachuca Mountains, May 20, 1895 (Swarth, *op. cit.*, p. 49). On September 3, 1934, at Coyote Range, Mrs. M. R. F.

Colton called my attention to a drowned bird in a bowl of water in her flower garden. It proved to be an immature male, Z8.524, of this species. Identification checked by McCabe.—LYNDON L. HAR- GRAVE, *Museum of Northern Arizona, Flagstaff, February 18, 1936.*

Notes from Maricopa County, Arizona.—During the period between January 31 and February 9, 1936, the writer, with three student assistants, S. G. Harter, Philip Lichty and Norris Bloomfield, collected birds and mammals for the San Diego Society of Natural History from a base camp 10 miles south of Gila Bend, Maricopa County, Arizona. Among the birds taken were a few worthy of mention, either for the locality or their occurrence at this season.

Green-tailed Towhees (*Oberholseria chlorura*) were particularly abundant and many were seen all during our stay. A single Woodhouse Jay (*Aphelocoma californica woodhouseii*) was seen and shot at by the writer on February 1; and two specimens of Chestnut-backed Bluebirds (*Sialia mexicana bairdi*) were taken from a small flock that was found ranging over the desert plains on February 8. Both the Leconte Thrasher (*Toxostoma lecontei lecontei*) and Crissal Thrasher (*Toxostoma dorsale dorsale*) were singing; a female of the former species that was collected showed signs of incubating. A single Myrtle Warbler (*Dendroica coronata hooveri*) was secured on February 8, and of two specimens of white-crowned sparrows collected, one was *Zonotrichia leucophrys gambelii* and the other *Zonotrichia leucophrys leucophrys*; taken on February 1 and 2, respectively. A pair of Canyon Towhees (*Pipilo fuscus mesoleucus*) was found, which, both from their behavior and from dissection, were apparently settled for the breeding season.

A small fresh water mollusk (*Succinea*) was found in the rump feathers of a Western Vesper Sparrow (*Poocetes gramineus confinis*) collected on February 4, and was the first example of molluscan "hitch hiking" via the avian trail that the writer had ever seen.—LAURENCE M. HUEY, *San Diego Society of Natural History, Balboa Park, San Diego, California, March 11, 1936.*

Asiatic Gyrfalcon in the Okanagan Valley, British Columbia.—The Asiatic Gyrfalcon so seldom is recorded from southern British Columbia that any observations of its actions would seem of interest to place on record. On December 19, 1935, a young female (*Falco rusticolus uraleensis*) was collected under the following circumstances.

I was motoring past a small brush-fringed creek in otherwise open country when some one shot at, and missed, a female mallard which then flew over the open range toward Okanagan Lake. A large falcon suddenly appeared and flying after the duck on the same level gained upon it rapidly, whereupon the duck swerved from its former straight course and the falcon shot past it. The duck then spiraled down to a small ice-covered pond where it alighted. The falcon flew swiftly toward the standing bird and in the next five minutes or so swooped at it again and again, each time clearing the duck by a foot or more. After this it alighted on the ice about eight feet from the duck and remained there motionless for a few minutes. The mallard quacked continuously but did not move from its position. The falcon then rose and again began swooping at the duck. By this time my companion and I were walking toward the pond, one on either side and several hundred yards apart. When distant from the pond about 75 yards the mallard rose and flew toward Okanagan Lake and the falcon, passing close to my companion, was shot.

In the crop of the gyrfalcon were approximately two ounces of flesh from the breast of a male mallard, identified by the presence of the characteristic chestnut-colored breast feathers. The weight of this specimen was three pounds and twelve ounces; bill, cere, and rectus pale green-blue gray; the bill darkening to dark gull gray toward center, and with the terminal third black; tarsus court gray; iris dark brown.—J. A. MUNRO, *Okanagan Landing, B. C., January 15, 1936.*

Bird Records from near Phoenix, Arizona.—Sheltered canyons in the vicinity of Phoenix, Arizona, have offered us many thrills, but the greatest probably came on January 23, 1936. We were below the Stewart Mountain Dam in a great semi-circular area made by the dam and the canyon sides. The winter had been mild, one side of the canyon was covered with generous splotches of chuparosa (*Beloperone californica*) in bloom. When we drove into the area we remembered having seen Costa and Black-chinned hummingbirds on February 10, 1934, in a similar situation about 25 miles away.

With the aid of 8-power binoculars we started working the area and soon found several each of Costa and Black-chinned hummingbirds and then noticed a larger one, which seemed to be spending at least a part of the time in the trees going over the undersides of the leaves and branches. Between feedings he chased a gnatcatcher away. Soon we saw the bright color of the bill and on consulting the guide realized we were seeing a Broad-billed Hummingbird (*Cynanthus latirostris*). We each saw it six or eight times at close range and with binoculars.

That should have been enough, but on the way home we stopped at Mesa to tell our friend Earl Sanders of our find and he said he had one for us. We climbed up about 18 feet in an old olive tree where he showed two young Western Mourning Doves (*Zenaidura macroura marginella*) about ready to leave the nest. From Mr. Sanders' notes we supply the following data: "Nest with two eggs found January 5, hatched the 9th or 10th." On January 23 they were well feathered, with the face marks plain. The nest was a last year's Mockingbird's nest.—HARRY L. CROCKETT and RUTH CROCKETT, 90 Columbus Avenue, Phoenix, Arizona, March 2, 1936.

A Harris Sparrow Observed near Chico, California.—On March 16, 1936, my wife and I were surprised to see a large black-faced, black-throated sparrow feeding with a flock of Gambel and Golden-crowned sparrows near our window. We soon identified the bird as the Harris Sparrow (*Zonotrichia querula*). The bird remained about our place for two days, giving us many opportunities to observe it at a distance of about 15 feet. Generally it was associated with the Golden-crowned Sparrows and occasionally would pursue one of these about the shrubbery and grapevines. During its brief stay at our ranch the bird sang several times from the higher branches of an apple tree. The song seemed to me to resemble that of the Gambel Sparrow though there was something distinctive about the last two notes. We tried to catch and photograph the sparrow but without success.—LLOYD G. INGLES, *Chico State College, Chico, California, March 23, 1936.*

Notes on Alaskan Birds.—1. Additions to the Avifauna of Kodiak Island. To my recent list (Bull. Chicago Acad. Sci., vol. 5, no. 3, 1935, pp. 13-54) may be added two more birds.

Phaeopus hudsonicus (Latham). Hudsonian Curlew. One record, an adult, unsexed, collected at Graveyard Point, Afognak Island, May 14, 1916, by the late E. M. Ball, and now in the United States National Museum.

Certhia familiaris montana Ridgway. Rocky Mountain Creeper. While my paper was in press, the late Harry S. Swarth wrote me that the California Academy of Sciences had a Kodiak-taken specimen of this creeper, collected by Hanna. This is the first record for the island. I am indebted to Mrs. Davidson for the complete data on this bird: Woody Island, Kodiak Island, September 21, 1920.

2. The Mongolian Plover on St. Lawrence Island and its status as a breeding species in North America. The United States National Museum has recently received a few birds from Paul Silook, an Eskimo collector on St. Lawrence Island. Among them is an adult (unsexed) Mongolian Plover, *Charadrius mongolus mongolus* Pallas, taken at Gambell, in the western part of the Island, in May, 1935. It constitutes the first record for this island and the date leads one to wonder if it might not have been going to breed there, but of that there is no evidence. Hitherto the species has never been recorded as nesting anywhere in North America, although the presence of three young birds on Nunivak Island in mid-August (Swarth, Pac. Coast Avif. No. 22, 1934, p. 27) was suggestive. However, now it may be definitely stated that it does nest in Alaska. The data are as follows:

In an earlier note (Condor, vol. 36, 1934, p. 89) I recorded an adult male Mongolian Plover collected at Goodnews Bay, Alaska, by Mr. D. Bernard Bull, on June 10, 1933. In a letter written to me on December 4, 1934, Mr. Bull said concerning this specimen, "... the Mongolian Plover was a nester; I took three eggs, nearly fresh and have them in my collection now; is this not the first American record of actual breeding?" I replied (December 13, 1934) that it was and that he should publish it. Nearly half a year later (May 11, 1935) I again wrote him urging him to publish his data, but either my letters never reached him or he was unable to attend to the matter. Inasmuch as a year has elapsed since his letter, I am publishing these data lest the record be lost.

3. The range of Peale Falcon. According to all authorities, the breeding range of *Falco peregrinus pealei* includes the Aleutian Islands (Kyska, Unalaska, the "nearer islands," that is, the eastern ones of the Aleutian chain) and the islands off the coast of southern Alaska (Sergief Island, Forrester Island) south to the Queen Charlotte Islands (Graham Island, Langara Island), and also the Commander Islands on the Asiatic side of Bering Sea. A recent study of this falcon reveals, however, that the birds breeding in the Commander Islands are different from Alaskan (that is, typical) *pealei*. The Commander Island birds have the pectoral spots, especially in the female, very much broader than in *pealei* and the abdominal bars somewhat broader as well. It seems that the name *rudolfi* Kleinschmidt (Falco, vol. 9, 1909, p. 19) based on a winter bird from Hakodadi, Japan, may be available for the Commander Island duck hawks, but this is not certain, for at least three races of the species are apt to occur in Japan in winter. Hartert and others have considered *rudolfi* a synonym of *pealei*, probably on the basis of comparison with Commander Island birds, which would indicate that the name be applicable to the birds of that area. The breeding range of the Peale Falcon, at any rate, is restricted to the Alaskan islands south to the Queen Charlotte group.—HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C., December 19, 1935.

Vermilion Flycatcher a Victim of the Dwarf Cowbird in California.—According to Herbert Friedmann, in his well known book, "The Cowbirds," our Vermilion Flycatcher (*Pyrocephalus rubinus mexicanus*) is seldom a victim of the Dwarf Cowbird (*Molothrus ater obscurus*). It is with considerable regret that I must report the following two nests as the first records for the State of California, these being in Coachella Valley, Riverside County.

A female flycatcher was flushed from a nest fifteen feet up in a screw-bean tree on April 27, 1935. At that time the nest contained one egg each of the flycatcher and the cowbird. Another visit to the nest was made on May 1, and the female flycatcher again flushed from the nest, which then contained one more egg of the cowbird. The egg of the flycatcher proved to be added and the eggs of the cowbird showed slight incubation. The male flycatcher was especially active around this nest on each day.

On the same dates another nest was visited in a similar location about a hundred yards distant. This nest was discovered by seeing the beautiful male flycatcher trying to drive a female dwarf cowbird from the nest which then contained one egg of the rightful owner. On my next visit the female Vermilion Flycatcher flushed from the nest and I found that there was one more egg of the flycatcher as well as an egg of the cowbird.

It is of interest to record that the two cowbird eggs from the first mentioned nest were of different types and one of the eggs was much like the cowbird egg found in the second nest.—WILSON C. HANNA, Colton, California, March 20, 1936.

Notes on a Fight between Alaska Jays and a Weasel.—In early May, 1924, while residing on the upper regions of Lake Creek, a small stream which empties into Wild Lake in the Endicott Mountains (Arctic central Alaska), now renamed Brooks Range, I witnessed a fight between two Alaska Jays (*Perisoreus canadensis fumifrons*) and a full grown weasel (*Mustela* sp.).

One forenoon I started up the side of a hill to secure some firewood before the snow crust got soft. Much of the snow had already melted, especially around stumps of trees where fairly large spaces were entirely bare. The patches of snow between such places varied from a few feet to about twenty feet in diameter. These patches of snow were well crusted and glazed because of the warm sunshine during the days, and the nightly change to bitter cold. Here and there within a snow patch twigs and sticks protruded, making holes about the size of a silver dollar where the snow had melted to the ground. The snow under the crust was to a great extent "honey-combed," leaving spaces through which small animals such as mice and weasels could find easy passage.

From not far away I heard the shrieks of birds which seemed to be coming closer. I decided to wait. Soon I saw two Alaska Jays flying from tree to tree, diving frequently at something on the ground. I kept still in order to see what was the matter. Soon a weasel, evidently full grown and still in its white winter coat which, however, was soiled with blood, ran toward a patch of snow directly in front of me and disappeared under it. Both birds were close behind and they rested on a limb of a small tree under which I was standing. They were within an arm's length of my head and could not help but notice me. It became apparent that my presence gave them confidence.

The birds had lost sight of the weasel and seemed rather excited about this. First one, then the other, would fly out over the patch of snow under which the weasel had disappeared, always coming back to rest again on the same limb. This maneuver was executed several times until the bolder of the two flew to the patch of snow to rest. I could not see the weasel but evidently the bird on the patch located his whereabouts. The bird took wing; at the same time the bird on the tree did the same. Both flew excitedly over the patch of snow. They soon returned to the tree and to my astonishment ceased shrieking. All was quiet for possibly a minute or more when through one of the smaller holes in the snow there appeared the head and forepart of the weasel. The two birds became highly excited and again flew out over the patch.

They would swoop down over the weasel, first one, then the other, striking with its beak. The weasel seemed cowed and ducked low after each strike. There were blood spots on the snow and it seemed to me the birds were doing very effective work.

I now moved a little closer, but neither the birds nor the weasel seemed to notice me. I talked aloud and whistled but they paid no attention. At times one of the birds would fly out, almost stop over the weasel, using the wings to brake with, and try to see how close he could get to the weasel with his feet. Each time this was done the weasel would stretch out, sticking his head and front of the body into the air. However, he did not seem to snap at the birds. On the contrary, frequently the weasel's mouth was open and it seemed to be panting and fairly well worn out.

Again I wanted to see how close I could get to the weasel. I took a long step which brought me to within four feet of the scene. The two birds flew back to the tree. The weasel now seemed to smell the air. Evidently it did not see me but it did get hold of the strange scent, and went backward into the hole and disappeared. It stayed there for some time and I thought that it might have

escaped. The birds were very still again, sitting on the limb, and I moved back to my former position under the tree.

It seemed that not a single movement of the weasel was missed by the birds. At one place where the crust on the snow was thin, the weasel managed to work under and in doing so broke some of the crust. Both birds saw this and flew down to the place where the snow moved and crumbled. The fight was on again.

The weasel rushed out and made a few jumps, one a very long one of about four feet, with the birds after him at once. However, by now the weasel had reached a pile of brush. The last glimpse I had of his coat it seemed bloodier than ever. Very likely he was familiar with the brush pile, which was effective in concealing him. For a while the two birds rested on a low willow bush right over the brush pile. Slowly they quieted down. No more did they let me get as close as they had before. They seemed to understand the weasel was safe and would not venture from the brush pile. They seemed to understand that to wait would be a waste of time. Finally, flying separately one a little behind the other, they began to retrace their way.

Sensing that they were a pair with a nest nearby, I tried to follow the birds. However, I soon realized the futility of such an undertaking, for they led me up hill and down and nearly back again to where we had been first. About this time I realized that they did not intend to have their nest with eggs or young disturbed again. They were certainly entitled to peace; for had they not put up a firm fight, possibly to protect their young from an animal which is known as one of the fiercest small fighters of the woods?—OTTO WM. GEIST, *University of Alaska, College, Alaska, March 21, 1936.*

Mockingbird in Eastern Montana.—On May 14, 1935, near Miles City, Montana, Mr. E. J. Woolfolk and the writer saw a mockingbird (*Mimus polyglottos*). The place was a low sage-brush plain, part of the old Fort Keogh Military Reservation, just west of Tongue River. The bird was on a barbed wire fence, about 100 feet from us. It had the same long tail with white outer feathers, the same broadish wings with white patches, the same stance and manner of flight, the same characteristics of song, only perhaps a little more subdued, that the writer has observed many times in southern California. However, this bird may have been slightly duller in color and a trifle smaller.

The bird was wary, but not especially timid. Although it would not permit us to come closer, it stayed in the vicinity, swooping occasionally with leisurely grace from wire to ground and back to fence post. But after that day it was not seen again.

This may be a record for Miles City, and perhaps Montana. The mockingbird is not catalogued in Saunders' distributional list of Montana birds, although it is recorded in the 1931 A. O. U. Checklist as occurring in southern Wyoming. P. A. Taverner, in his "Birds of Canada" (1934), says, "Lately stray individuals have been seen in southern Manitoba, Saskatchewan, Alberta and in southwestern British Columbia"; and he lists this as one of several species which periodically expand their ranges from the south, and contract them again.—LINCOLN ELLISON, *Miles City, Montana, April 21, 1936.*

Bird Notes from the Papago Indian Reservation, Southern Arizona.—Over a period of five and a half months, from September 1, 1934, to February 15, 1935, the writer was employed by the United States Indian Service in making a range reconnaissance of the Papago Indian Reservation in south-central Arizona. During this time, approximately 100 days were spent in the field, permitting the writer to make ornithological observations in every part of the Reservation, and thus to gain a cross-section of the fall and winter bird-life of the area.

The Papago Reservation has an area of approximately four million acres, and is almost entirely Lower Sonoran in flora and fauna. Practically all field work was done in this zone, which is characterized by such desert plants as creosote bush (*Larrea tridentata*), mesquite (*Prosopis glandulosa*), salt-bush (*Atriplex* spp.), giant cactus (*Carnegiea gigantea*), cholla cactus (*Opuntia fulgida*), palo verdes (*Parkinsonia microphylla* and *Cercidium torreyanum*), ironwood (*Olneya tesota*), and bur sage (*Franseria deltoidea*). The elevation ranges from 2000 to 4000 feet, the terrain consisting of small, rugged mountain ranges with intervening broad valleys.

The following 24 species of birds may be classed as the most common fall and winter birds of the Reservation, most of them being seen throughout the two seasons, and recorded on more than 40 days of the 100 spent in the field. Turkey Vulture (*Cathartes aura*), Western Red-tailed Hawk (*Buteo borealis calurus*), Desert Sparrow Hawk (*Falco sparverius phalaena*), Gambel Quail (*Lophortyx gambelii gambelii*), Western Mourning Dove (*Zenaidura macroura marginella*), Red-shafted Flicker (*Colaptes cafer collaris*), Gila Woodpecker (*Centurus uropygialis uropygialis*), Cactus Woodpecker (*Dryobates scalaris cactophilus*), Say Phoebe (*Sayornis saya*), Horned Lark (*Otocoris alpestris* subsp.), White-necked Raven (*Corvus cryptoleucus*), Arizona Verdin (*Auriparus flaviceps*), Northern Cactus Wren (*Heleodytes brunneicapillus couesi*), Common Rock Wren (*Salpinctes obsoletus obsoletus*), Palmer Thrasher (*Toxostoma curvirostre palmeri*), Gnatcatcher (*Polioptila* sp.), Western Ruby-crowned Kinglet (*Corthylio calendula cineraceus*), Phainopepla (*Phainopepla nitens*

lepida), White-rumped Shrike (*Lanius ludovicianus sonoriensis*), Common House Finch (*Carpodacus mexicanus frontalis*), Canyon Towhee (*Pipilo fuscus mesoleucus*), Lark Bunting (*Calamospiza melanocorys*), Western Vesper Sparrow (*Pooecetes gramineus confinis*), and Desert Sparrow (*Amphispiza bilineata deserticola*). Of these birds, only the following may be classed as purely winter residents, since they breed elsewhere than on the Reservation: Red-shafted Flicker, Western Ruby-crowned Kinglet, Western Vesper Sparrow, and Lark Bunting.

The following species uncommon enough to be of special interest were observed:

Red-throated Loon (*Gavia stellata*). One at Anegam Charco, November 2, observed at close range.

Black Vulture (*Coragyps atratus atratus*). A flock of ten seen near Pacinimo, January 7.

Harris Hawk (*Parabuteo unicinctus harrisi*). Seen occasionally, especially in palo-verde-iron-wood woodland.

Mexican Goshawk (*Asturina plagiata plagiata*). One in Moristo Canyon, Baboquivari Mountains, on February 11. (The Baboquivari-Quinlan-Coyote mountain range, forming the southeast boundary of the Papago Reservation, reaches altitudes of from 6000 to 8000 feet, and from 4000 feet on up is Upper Sonoran Zone, the most prominent plant being the oak. The writer spent seven days in the field in this zone.)

Audubon Caracara (*Polyborus cheriway audubonii*). Seen but twice, near Old Fresnal, January 19, and in the Sierra de la Union, January 26.

Long-eared Owl (*Asio wilsonianus*). One seen October 16 at Poso Redondo.

Mearns Woodpecker (*Balanosphyra formicivora aculeata*). One September 17 at Cocklebur, another September 27 at Bitter Well. Evidently a rare fall migrant.

Long-crested Jay (*Cyanocitta stelleri diademata*). Seen generally during September, October, and November, in pairs or in small flocks at elevations below 4000 feet, entirely in the Lower Sonoran zone. Were especially common at San Pedro about November 15. It seems odd that they should wander so far from their breeding grounds in the Transition and Canadian zones considerably to the north and east of the Reservation. Such action on their part is perhaps infrequent.

American Pipit (*Anthus spinoletta rubescens*). Several flocks at Charco 19 on October 7, 8, and 10.

Lawrence Goldfinch (*Spinus lawrencei*). Seen October 2 at Bitter Well, October 9 and 10 at Charco 19, October 11 at Toapit, October 12 and 16 at Poso Redondo.

Scott Sparrow (*Aimophila ruficeps scottii*). A few individuals seen February 10 and 11 in the Baboquivari Mountains at 4500 feet, where the species is undoubtedly a permanent resident.

Mexican Black-chinned Sparrow (*Spizella atrogularis atrogularis*). Two seen February 10 in the Baboquivari Mountains at 5000 feet elevation; perhaps is a permanent resident there.

In all, 120 species were observed by the writer while he was present on the Reservation.—GALE MONSON, Soil Conservation Service, Safford, Arizona, April 24, 1936.

Nesting of the Allen Hummingbird.—On March 25, 1933, the writer was working in his garden in North Berkeley when a female Allen Hummingbird (*Selasphorus alleni*) was seen to fly out from under a small covered entrance to his home. Upon making an examination an ivy vine was found to be hanging down about 6 inches from the ceiling, and upon this were found a few pieces of plant down, the start of a nest. This was located about 2½ feet above a person's head, and in such a location that anyone entering the door must pass directly under it.

On March 27, the female was seen to arrive at the nest with a bunch of plant down in her bill. This she deposited in the bottom of the nest and worked it in with her feet and body. On the 28th she was seen to arrive with a spider web in her bill. This she placed on the outside of the nest, and then wound it around the nest with her beak. Several times during the next few days the female was seen to come to the nest with plant down or spider webs in her bill. These she worked into the nest with her feet or bill, and then seemed to shape the nest by moving around and settling down in it.

On April 1, the nest was examined at 9:45 a.m. and there was one egg present. No eggs were laid on the 2nd, but when the nest was examined at 7:30 a.m. on the 3rd, a second egg was in it. During the next few days the nest was watched without anything of note, but on the 7th, the Hummingbird was seen to bring in some plant down in her mouth. On the 10th, one broken egg, partly incubated, was found on the floor below the nest.

Nothing had happened when the nest was examined late on the evening of the 18th, but when it was examined at 7:45 a.m. on the 19th, one young was present. An electric light turned on at night did not bother the mother bird, but when the door was opened in the day-time, she was off the nest in a flash.

From this time the parent bird was on the nest quite regularly during the day-time, but the

writer was unable to see her feed the young. At no time was the male seen near the nest. A few days before the young left the nest, it was noted that the female did not spend the night on the nest. On May 11, the young bird was heard twittering constantly, and when picked up it made its wings buzz as do the old ones when flying. Just before noon it left the nest and has not been seen since.

The old nest was removed, and on June 4, another nest was built in the same spot. On account of leaving for the mountains, the writer was not able to follow up the history of this second nest.—ERNEST D. CLABAUGH, 44 Lenox Road, Berkeley, California, April 17, 1936.

The Western Palm Warbler in New Mexico.—White Sands National Monument is located 18 miles southwest of Alamogordo, in Otero County, New Mexico, at an elevation of 4000 feet. Adjoining the Sands on the east is a marsh of about 200 acres, which in this desert area attracts many birds. Here, on December 6, 1935, I saw a lone bird which I had not previously observed in this area. It was first seen on the ground, then among the tules, and later on top of a building. On the ground its appearance and actions were somewhat like those of a pipit.

The bird was collected and prepared as a study skin. It proved to be an adult female, and was later identified at the Museum of Vertebrate Zoology, Berkeley, California, by Dr. Joseph Grinnell, as a Western Palm Warbler (*Dendroica palmarum palmarum*). This species is found west of the Mississippi valley only as a straggler, and there appears to be no previous record of it in the State of New Mexico. The specimen is now deposited in the study-skin collection at White Sands National Monument.—A. E. BORELL, National Park Service, Department of the Interior, March 28, 1936.

Bird Records from Merced County, California.—On April 6, 1936, a friend, Mr. T. D. Southward of LeGrand, Merced County, who has been banding birds for a year or more, called on me with a strange sparrow in his cage. After consulting Coues' Key and asking the opinion of Mr. J. A. Neff, I determined it to be a male Harris Sparrow (*Zonotrichia querula*) in molting plumage.

The specimen is now in my Merced County collection. Another young friend of mine from near LeGrand, Mr. Calvin Stevens, who also bands birds occasionally, has a record or two of interest. On February 28, 1936, he captured a male juvenile White-throated Sparrow (*Zonotrichia albicollis*). On March 1, 1936, he added a Sage Thrasher (*Oreoscoptes montanus*) to Merced County records. On February 2, 1936, he shot a beautiful adult male Goshawk (*Astur atricapillus*) on the bank of a creek in Merced County near the Sierra Nevada foothills.—R. H. BECK, Planada, California, April 8, 1936.

Twenty Condors Dine Together.—On April 25, 1936, Mr. O. P. Brownlow, Captain of Patrol, Division of Fish and Game, was driving over the rolling plains country about mid-way between Bakersfield and Kern Canyon proper. There a smaller road, to the Kern River Golf Club, branches off the main artery. Along this small road and about 200 yards from the road he was traveling, Mr. Brownlow noticed a number of large black birds. At first he thought they were buzzards. He stopped to watch them and two of the birds had an argument, displaying white under-wing patches. He then realized they were California Condors (*Gymnogyps californianus*).

Walking toward the spot, he found there were 20 of the great birds eating the carcass of a sheep. Hundreds of these animals had but recently pastured there. As he drew nearer 19 Condors readily took to the air, flying in different directions. One huge bird had difficulty in getting off the ground. The white areas seemed unduly large to Mr. Brownlow. When this Condor finally arose Mr. Brownlow looked about for the others. Six had alighted about a quarter of a mile away. Several were headed up the Kern Canyon, the rest in other directions, Hoping they would return Mr. Brownlow hurried back to Bakersfield to bring a camera and other folk to see them. But when he returned not a Condor was to be seen.

I have heard on good authority that WPA workers have seen six Condors, this past winter, in the vicinity of Breckenridge Mountain, which is opposite Hobo Hot Springs. From the directions the various components of the large flock took Mr. Brownlow and I feel there is a possibility that it was a "gathering to the feast" of Condors from Breckenridge, the Tehachapi and Tejon.—LILA M. LOFBERG, Kernville, California, April 29, 1936.

California Woodpeckers Storing Walnuts.—At the corner of Del Mar Street and South Madison Avenue, in the heart of Pasadena, there stands an extra tall telephone pole that is literally pock-marked for a distance of twenty feet by the drillings of California Woodpeckers (*Balanosphyra formicivora bairdi*). Also many long cracks in the pole were wide enough to receive acorns. Near the top of this pole one nesting cavity can be plainly seen.

On February 22, 1935, four birds were busily engaged stuffing some sort of food into the storage pits. In the neighborhood, planted as sidewalk trees, are many live oaks which possibly had attracted the California Woodpeckers to the district. However, on the date of my visit, there were no acorns to be found; nor was there any evidence, such as fallen acorn hulls, to indicate that acorns had ever been stored. It seemed odd to me that woodpeckers should be so busy storing at this season of the year.

By watching the birds, I soon learned that they were storing *walnuts*. The holes were not cut to fit the walnuts and so the birds cut the walnuts to fit the holes. In the yards round about were many fine old walnut trees. The Woodpeckers were recovering fallen nuts, neatly splitting the nuts and storing the meat away piecemeal in the manner that the Lewis Woodpeckers store acorns. Littering the ground at the base of the pole were many empty walnut shells.

I was wondering if this late storing might not have resulted from the fact that walnuts lying on the ground through the winter would be more easily split than nuts freshly gathered from the trees. But when I visited the storage pole this year I found the woodpeckers already storing shelled walnuts on January 30, and now they were gathering the nuts from the trees instead of picking them up from the ground. And too, it was learned that the colony had increased by at least one bird, as five birds were seen on the pole at one time. Also, this year many acorns are stuffed away in the holes and cracks of the pole. There was no evidence to indicate that the birds of the colony had begun to draw on the store of acorns. But then why should they draw on their stores, with nuts and berries so plentiful in the neighborhood!—CHAS. W. MICHAEL, Pasadena, California, January 31, 1936.

Live Weights of Certain Hawks.—The live weights of hawks are rarely given in ornithological literature, but they are of great interest to falconers, because weight is one of the best aids in judging the condition of a bird. Weights in the first column of the accompanying table were taken under conditions of maximal feeding, 2 to 6 weeks after the immature birds would have left the nest. The 2nd, 4th and 6th duck hawks in the table regained almost exactly the given maximal weights during heavy feeding in the first molt. Weights in the second column are of birds in full training, when flying at their best. It will be observed that the training and maximal weights do not differ by more than about 15 per cent.

Falco rusticolus near candicans	♀ Ivigtut, Greenland	1475±5	.....
Falco rusticolus between candicans and obsoletus	♀ Ivigtut, Greenland	1475±5	.....
Falco mexicanus	♀ Wyoming	.....	765±5
Falco mexicanus	♀ California	850±10	740±10
Falco mexicanus	♂ California	640±10	510±10
Falco mexicanus	♂ California	640±10	480±10
Falco peregrinus anatum	♀ New York	1020±5	920±5
Falco peregrinus anatum	♀ Massachusetts	1320±5	1160±10
Falco peregrinus anatum	♀ Connecticut	1075±5	.....
Falco peregrinus anatum	♂ Massachusetts	665±1	610±1
Falco peregrinus anatum	♂ Massachusetts	875±1	.....
Falco peregrinus anatum	♂ New York	750±5	650±5
Falco columbarius columbarius	♂ Ontario	191±1	156±1
Falco columbarius columbarius	♀ Ontario	241±1	210±1
Falco columbarius columbarius	♀ Ontario	234±1	.....
Falco columbarius columbarius	♀ Ontario	205±5	.....
Falco columbarius columbarius	♀ Ontario	205±5	.....
Falco columbarius richardsonii	♀ Alberta	255±5	.....
Falco sparverius sparverius	♂ Connecticut	118±1	.....
Falco sparverius sparverius	♀ Connecticut	127±1	.....
Falco sparverius phalaena	♀ California	130±10	.....
Accipiter velox velox	♀ California	230±10	210±10
Accipiter cooperii	♀ California	450±10	.....
Accipiter cooperii	♀ New York	.....	510±5

The various accuracies given with the weights indicate the dependability of the different balances used. All weights are in grams and represent the birds with empty crops and stomachs; the smallest birds on the list can hold about 50 grams of food and the largest about 250 grams.—RICHARD M. BOND, Oakland, California, December 3, 1935.

NOTES AND NEWS

Now that the attention of tourists has been directed to southern Nevada on account of the newly completed Boulder Dam, many visitors to that area doubtless will wish to know the nature of the bird life in the surrounding region. The Cooper Club has filled this need, in part, by the publication on May 1, 1936, of Pacific Coast Avifauna No. 24, *Birds of the Charleston Mountains, Nevada*, by A. J. van Rossem. This 65-page book contains an illustrated general description of the region, as well as comments on occurrence and systematic status of 160 kinds of birds known to occur in this high mountain range. It is sold to Club members for \$1.00 by W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, California.—J. M. L.

Most of us believe that something should be done to aid in the development of the study of natural history in the public schools, but few persons have made any definite move in this direction. One member of the Cooper Club, Dr. Gayle Pickwell, has done more than his share to help teachers who want materials, especially for bird study. From his large stock of photographs he has selected three sets of forty-eight pictures. These make up three units, Animal Studies, Desert Studies, and Bird Studies, in the series called Natural History Pictures. Each picture is printed on an 8×10 inch card and each unit is accompanied by explanatory text. The topics have been chosen for widespread application from photographs taken at many localities in the United States. The units are sold for six dollars each by Publishers Distributing Service, Inc., 704 South Spring Street, Los Angeles.—J. M. L.

Persons who study birds are constantly wondering what previous studies have been made in whatever topic they are considering. Aside from the *Auk* which has always contained extensive notices of publications concerning birds, two other helpful review services lately have appeared. The recent expansion of the review department of *Bird-banding*, under the energetic supervision of Mrs. Nice, has provided abundant source material dealing with avian biology. Still more recently have appeared three mimeographed numbers of the *Wildlife Review*, an abstracting service for wildlife management issued for the information of cooperators by the Bureau of Biological Survey, United States department of Agriculture. The aim is to cover the field of wildlife management in a comprehensive manner, and the enterprise is conducted by W. L. McAtee, principal biologist and technical adviser, Office of the Chief. It is thus assured that the reviews will be authoritatively critical and

of maximum usefulness to the many newcomers into this field.—J. M. L.

Expansion of governmental agencies connected with wildlife study and conservation has placed increased numbers of competent men in the field. Already their activity along ornithological lines is seen in records and observations appearing in the *Auk*, *Wilson Bulletin* and *Condor*. The necessary substantiation of records by collected specimens results in the preservation of scientifically important material. Our hearty approval of the study collection of birds in local display museums such as those in National Parks and Monuments does not extend to the preservation of record specimens in such places. Personal experience in the building and maintenance of a park museum collection has shown convincingly the insecurity of bird skins there over periods of years. Continuity of curatorial activity in institutions whose primary function is other than that of preserving scientific records cannot be counted upon. Care of record specimens of no particular interest to the layman or casual visitor should be entrusted to a regional or national institution readily accessible to scientists, where long-time preservation is assured. Have sympathy for the compiler and verifier of records fifty years hence! The logical repository for specimens obtained by governmental agencies is the United States National Museum. Since the time of the early biological surveys of the West, and long before the governmental centralization now in vogue, the National Museum was the accepted guardian of such materials.—A. H. M.

One of the intensely interesting topics dealt with by Murphy in his *Oceanic Birds of South America* (1936, pp. 1099ff) relates to the Arctic Tern (*Sterna paradisaea*). Briefly, his findings demonstrate that there is a distinct species of tern (*Sterna vittata*), permanently resident in antarctic seas, and that this species again and again has been misidentified as *paradisaea*; the two can be "hardly distinguished in the field," and indeed many specimens in hand have been misnamed. In the course of his painstaking review of all the published and assembled evidence, Murphy comes to "a consideration of the legend which may yet prove to be a far-reaching ornithological illusion, namely, that the Arctic Tern on its annual migration regularly crosses the antarctic circle, enters the pack-ice zone, and attains latitudes as high as 74° S." This "legend" goes back to Cooke (U. S. Dept. Agric., Bull. No. 185, 1915, p. 10). "But Cooke's report, with the much-republished chart showing the summer and winter ranges of the Arctic Tern—at opposite

ends of the earth [involving an annual round trip of 22,000 miles]—is entirely undocumented, and so the subject becomes more and more elusive." The latest perpetuation of the "legend" in question appears so recently as 1935 (Lincoln, U. S. Dept. Agric., Circular No. 363, p. 32), wherein, accompanying a modified migration chart, the figure for the Arctic Tern's annual mileage reaches 25,000! Murphy has done a distinct service to the *science* of ornithology in thus bringing to bear upon certain current generalizations the method of critical review of basic data. No telling how many more of our current notions, not alone concerning bird-migration, may be improperly grounded in fact. Some of us occasionally have to stand the jibe that our field is a glorified hobby rather than a serious science! The critical faculty intelligently exercised, the results plainly announced, will go far toward bringing respectful regard of scientific men at large toward ornithology as a genuinely scientific field of endeavor.—J. G.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MARCH.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 26, 1936, at 8 p.m., in Room 2503 Life Sciences Building, Berkeley, with Vice-president McLean in the Chair and about 90 members and guests present.

Minutes of the Northern Division for February were read and approved. Minutes of the Southern Division for February were read. Names proposed for membership were: John W. Hamlin, 9 Bridge Road, Berkeley, Calif., by J. M. Linsdale; Albert C. Hawbecker, 2206 Dwight Way, Berkeley, Calif., by W. H. Behle; Dr. Lloyd Glenn Ingles, Durham, Calif., by J. Grinnell; Floyd Howard Wymore, 906 Virginia Terrace, Santa Paula, Calif., by J. Grinnell; Mrs. Stafford L. Jory, 1370 Euclid Ave., Berkeley, Calif., by Antoinette Hillebrand.

Mr. E. Raymond Hall spoke briefly reminding members that Thomas Nuttall, the naturalist, landed at Monterey in the month of March one hundred years ago, and that his memory is perpetuated for Californians in the generic name of the Olive-sided Flycatcher, the specific names of the Yellow-billed Magpie and the Dusky Poorwill, as well as in the subspecific names of the Nuttall Woodpecker and the Nuttall White-crowned Sparrow.

Mr. Elmer Aldrich reported having seen a Slate-colored Junco in Strawberry Canyon in early March; Mr. Gibson, a Townsend Warbler in Live Oak Park on March 5; and the Secretary, the presence in Mrs. Charles Newhall's Berkeley garden of a White-throated Sparrow, presumably the same individual having been noted daily since February 9. The Chairman told of seeing both White-throated Sparrow and Tree

Sparrow in Lassen County in February. Mr. C. A. Pease told of sheltering a young Horned Owl in his basement last summer. His regret at being unable to supply the birds with pellet-forming food vanished when he found pellets showing that the owl had secured the needed roughage from asbestos pipe-covering and hemp rope. Mr. C. W. Quaintance reported that both in the morning and late afternoon of March 19 he had noted a female, or yearling male, Golden-eye Duck on the swimming pool in Strawberry Canyon.

The evening's program was provided by the following five speakers: Mr. Elmer Aldrich, Miss Mary M. Erickson, Major Allan Brooks, Mr. Edwin H. McClintock, and Mr. Charles W. Quaintance. Mr. Aldrich discussed the behavior of female Allen Hummingbirds during the nesting season, and the reactions of their young. Miss Erickson gave an account of the activities of two pairs of California Jays which she is watching in Strawberry Canyon as part of her study of the economic position of the species. Miss Erickson stated that she would be happy to receive accounts of observations made on Jays by other Club members.

Major Allan Brooks spoke upon the care of bird sanctuaries and described the one established by himself at his cottage near Comox, British Columbia. There, in a small area, to achieve greatest success he found it necessary to eliminate certain hawks, jays, snakes, cats, ants and slugs. Mr. McClintock reported upon the locations and construction of fifteen Bush-tits' nests which he has watched this spring. Mr. Quaintance sketched upon the blackboard a portion of the University Campus and delineated thereon the territorial activities of several pairs of banded Brown Towhees, among them being an individual banded five years ago by Mr. Sumner.

Adjourned.—HILDA W. GRINNELL, Secretary.

APRIL.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, April 23, 1936, in Room 2503 Life Sciences Building, Berkeley, with President Miller in the Chair and about 70 members and guests present. Minutes of the Northern Division for March were read and approved. Minutes of the Southern Division for March were read.

Mr. Grinnell presented for examination, "Oceanic Birds of South America," much of the material for which was collected by Rollo H. Beck while in the employ of Dr. L. C. Sanford. Mr. Grinnell paid high tribute to Robert Cushman Murphy, author of this exhaustive two-volume work, and to his illustrator, Francis L. Jaques. Certain of the birds dealt with by Murphy are wide-ranging, such as the Chilean Skua which has been found as far north as the waters off the state of Washington.

The very successful Eleventh Annual Meeting of the Cooper Club, held April 17 to 19 at Los Angeles, was reviewed by President Miller, and the outing meeting in Sespe Canyon, Ventura County, which followed it, by Mr. Grinnell.

Mr. W. B. Davis read a paper on birds found by him wintering in southern Idaho. Of especial interest were his remarks on the winter habits of the Gray Titmouse and the California Quail, the latter occurring in Idaho only as an introduced species and there subjected to a much more rigorous winter climate than any encountered in its normal range.

Mrs. Allen spoke upon the effect on birds of the spring spraying of live oaks, as observed by herself on the University Campus and about her home, which is situated among oak trees. The speaker felt that in normal years spraying should not be necessary, as the resident birds aided by spring migrants are able adequately to control the caterpillars which infest the oaks. In the discussion which followed Mrs. Allen's talk, Mr. Dyer agreed with the speaker that the problem merits further study. On his own property, where 75 or 100 oaks were sprayed two years ago, he saw no dead birds on the ground nor any dislodged nests. The latter fact was perhaps accounted for by his having pointed out nest locations to the spraying crew before they began their work. Fifty-one nest positions were thus protected.

Dr. George Haley told of the habits of Least Auklets on the Pribilof Islands and of the sagacity of the island foxes which learned to lie in wait for falling birds stunned by overhead wires at a certain landing place.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

SOUTHERN DIVISION

MARCH.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, March 31, 1936, at 8 p.m., at the Los Angeles Museum, Exposition Park, Los Angeles, with President Little in the Chair and 39 members and guests present. Minutes of the Southern Division for February were read and approved. Minutes of the Northern Division were read. Application for membership in the Club, of Thos. G. Scott, Science Building, Iowa State College, Ames, Iowa, was proposed by W. Lee Chambers.

In the absence of Wright Pierce, who was reported ill, Mr. Ross spoke briefly on the proposed trip to Catalina Island, on Sunday following the Annual Meeting. He said that a price of \$2.50 per ticket had been obtained from the boats running to the island. President Little extended an invitation to the Southern California Avicultural Society, and stated that notices of the meetings were to be mailed to all members living in and near Los Angeles.

George Willett told about the recent Depart-

ment of Agriculture Bulletin he had received, on the report of a game farm in Oklahoma. Mr. Wood spoke of his visit to the bird sanctuary in Griffith Park with his class on March 3, and of seeing a nearly white California Thrasher, which was apparently mated with a normally colored bird. George Willett moved that the Southern Division follow the Northern Division, in requiring that a written note be handed to the Secretary, of anything unusual that had been spoken of in a meeting. The motion was seconded by Mr. Glassell, and after some discussion was duly passed.

Mr. Ross reported on the feeding of the Chinese Spotted Doves on the fallen stone fruits of the Fan Palms. Miss Faddis gave an interesting talk on a trip she had taken recently and of the number of species of birds that she had seen in the different places visited; she commented especially on the great number of birds that had been seen at her camp in "Clary's backyard." Mr. Rowley spoke of his recent trip to Catalina Island, and also of his trip to Blythe and the different birds noted breeding along the Colorado River. At Catalina, Allen Hummingbirds were noted with young and a number of pairs of Dusky Warblers were seen nest-building.

Adjourned.—SIDNEY B. PEYTON, *Secretary*.

APRIL.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held on Tuesday, April 28, 1936, at 8 p.m., at the Los Angeles Museum, Exposition Park, Los Angeles, with President Little in the Chair and 33 members and visitors present. Minutes of the Southern Division for March were read, corrected and approved. Minutes of the Northern Division for March were read.

Applications for membership were presented, as follows: A. F. Tomlinson, 506 Newport Avenue, Long Beach, Calif., Harold S. Colton, Museum of Northern Arizona, Flagstaff, Arizona, and Mrs. E. L. Adams, 1712 Milan Avenue, South Pasadena, Calif., by W. Lee Chambers; Miss Linnea M. Johnson, P. O. Box 156, Turlock, Calif., and Mrs. Mildred L. Bupp, 216 Maiden Lane, Montebello, Calif., by John McB. Robertson; Prof. Frederick A. Saunders, 8 Berkeley Place, Cambridge, Mass., by Harold Michener; Dr. Thomas B. Nolan, U. S. Geological Survey, Washington, D. C., by Parker D. Trask; Gordon G. Philp, 540 South Lucerne Blvd., Los Angeles, Calif., by Emerson W. Stanley.

Letters from Wright M. Pierce, and Dr. Clinton G. Abbott, expressing their appreciation of the programs which were signed by all present at the Annual Banquet, and sent them, were read. A motion was passed instructing the secretary to write a letter of appreciation to Major Allan Brooks, for the fine paintings which were hung in the art gallery during the Annual Meeting.

Members reporting on recent trips and obser-

ventions were: John McB. Robertson, C. O. Reis, George Willett, and Dr. Louis B. Bishop. The program for the evening was presented by George Willett who read a paper by Walter J. Eyerdam, "Birds collected in the summer of 1932 in the eastern Aleutian Islands." Mr. Willett commented on his own experiences in the same territory.

Adjourned.—SIDNEY B. PEYTON, *Secretary*.

ELEVENTH ANNUAL MEETING

The Eleventh Annual Meeting of the Cooper Ornithological Club opened at the Los Angeles Museum on Friday morning, April 17, 1936. President Luther Little of the Southern Division read letters and telegrams from members unable to attend, and then called on Dr. Comstock, Assistant Director of the Los Angeles Museum, to welcome the members to the annual meeting. Dr. Alden H. Miller responded in behalf of the visitors from the Northern Division.

The following papers took up the balance of the first morning's session: More notes on the bird-mistletoe relationship, by Dr. Raymond B. Cowles; Reasons for the disappearance of bird life, by Prof. Mary Louise Fossler; Abnormalities in birds—albinism, by Mr. Harold and Mrs. Josephine Michener; Faunal associations and life zones in relation to Pleistocene birds of California, by Dr. Alden H. Miller.

Adjournment for lunch was next in order, and after following Lee Chambers and George Willett for a couple of blocks and up a labyrinth of stairs in the Students Union, University of Southern California, a delicious luncheon was enjoyed by all those who didn't get lost by the wayside. There were fifty members and guests present at the morning session, and by the time the afternoon session began there were seventy on hand to enjoy the wonderful series of motion picture films that were shown. The following pictures filled the afternoon: Wildfowl population and percentages and the March of Time No. 8, by Mr. S. D. Platford; Birds of the Finger Lakes (New York) marshes, from Dr. A. A. Allen; Wildlife conservation in America, by Mr. John H. Baker; National bird refuges, from United States Department of Agriculture; Hooters and honkers, from University of California Department of Visual Education; North of Battle Harbor, film narrative of the Bowdoin-MacMillan Arctic Expedition, from Dr. Alfred O. Gross. Dr. J. M. Linsdale read a paper on Coloration of downy young birds and of nest linings. The motion pictures were all interesting, most especially the one showing the nesting of the different birds in the Finger Lakes marshes.

The meeting of the Board of Governors was held Friday evening at the Los Angeles Athletic Club, with Howard Robertson acting as host. Saturday morning, after a short business session,

the program continued with papers by Mr. Roland Case Ross on Primitive bird song and its occurrences, Subspecific appraisal of Red-breasted Sapsuckers, by Dr. Joseph Grinnell; and Bird life of the mangrove esteros of Sinaloa, Mexico, by Chester C. Lamb, read by Steve Glassell. Motion pictures shown included Birds of the western United States, by A. M. Bailey; Our feathered friends and Gray-crowned Leucosticte, by J. B. Dixon. Papers by Dr. Loye H. Miller, A fourth locality for *Chendytes*, and Dr. Hildegard Howard, Fossil birds from the Del Rey Hills, were read by title only.

Adjournment was then in order and another luncheon at the Students Union, University of Southern California, was enjoyed. After luncheon the program continued: Respiration of the California Brown Pelican, by Miss Mabel Fossler; Seasonal change in color of the gular sac of the California Brown Pelican, by Dr. Louis B. Bishop; Blood parasites of California birds, by Dr. S. F. and Mrs. Fae D. Wood; Some British birds, by Dr. W. A. Hilton; Hawk Mountain Sanctuary, by M. P. Skinner; The present status of the Roseate Spoonbill in the United States, by Robert P. Allen, read by Laura B. Law; The Hancock Expedition of 1935 to the bird islands of Peru, by John S. Garth; The birds of Utah, by A. M. Bailey; Some birds of the Yosemite, by Mrs. C. W. Michael.

This concluded the program at the Museum, and the last, but not the least enjoyable, meeting on Saturday took place at the County Medical Association Buildings, where the Annual Banquet was held. After every one had cleared his plate, and Steve Glassell two plates, the retiring toastmaster, Dr. Loye Miller, turned the robes of his office over to the newly elected president of the Board of Governors, George Willett, who then called on many of the members successively for more or less fitting remarks. The banquet was ended with everyone agreeing that we had held a successful and entertaining series of meetings.—SIDNEY B. PEYTON, *Secretary, Southern Division*.

Field Trip.—Should the Secretary of the Southern Division of the Cooper Club record the loveliness of Ventura County in the spring, he would probably be accused of undue favoritism toward his own ecologic niche! Hence it has been left to a visitor from the Northern Division to set down the delights of an April day in Sespe Canyon. Closing the Eleventh Annual Meeting of the Cooper Ornithological Club an all-day field trip was held on Sunday, April 19. Leaving Los Angeles at 9:15 a.m., we were driven for two hours through thriving suburbs, with their wealth of roses, over Cahuenga Pass, north through San Fernando, toward Newhall and Saugus. Turning westward down the Santa Clara River, we left an arid corner of Los Angeles

County behind, then drove along acres of Ventura County orchards where the air was heavy with the fragrance of orange blossoms; thence through Fillmore, across the Sespe River bridge, and turned eastward up the left side of Sespe Canyon. The morning's fog clouds drew away, and high over head a dark speck appeared in the sky. We had been promised California Condors, but the first bird to soar across the Canyon's mouth was a Golden Eagle.

Just as we reached Henley's Camp, where the autos were to be left, a veritable Condor came in sight, flying low over the ridge back of the camp. A three-mile walk up the canyon road revealed thirty-five species of birds, many individuals in fine song, all playing their unconscious parts in giving us a full day's pleasure, from the huge Condor overhead to the tiny Costa Hummer on her nest in the yerba santa.

Californians are never superlatively happy save when pointing out the especial charms of California to visitors from the Atlantic coast. The pleasure of so doing was granted us by Prof. and Mrs. Frederick A. Saunders of Cambridge, Massachusetts, who kindly shared our enthusiasms. Back at Henley's in mid-afternoon we were served a bounteous picnic luncheon by Mrs. George Willett and Mrs. Sidney Peyton, both of whom had generously remained behind to arrange it. As we enjoyed our coffee, three Condors soared on set wings high over the canyon's brim to allow us one long last appreciation of their majestic flight.—H. W. GRINNELL.

GOVERNORS' MEETING

The Fifteenth Annual Meeting of the Board of Governors of the Cooper Ornithological Club was held at the Los Angeles Athletic Club, Los Angeles, California, April 17, 1935. The meeting was called to order at 8 p.m., with President Loye H. Miller in the Chair and the following members present: J. S. Appleton, Louis B. Bishop, W. Lee Chambers, R. B. Cowles, Joseph S. Dixon, Hilda W. Grinnell, Joseph Grinnell, Harry Harris, Laura B. Law, Jean M. Linsdale, Luther Little, Harold Michener, Alden H. Miller, Loye H. Miller, J. R. Pemberton, Sidney B. Peyton, Guy C. Rich, Howard Robertson, John McB. Robertson, and George Willett. Proxies were presented as follows: Amelia S. Allen, H. C. Bryant, Henry W. Carriger, Herbert L. Coggins, W. K. Fisher, and Donald McLean, by Joseph Grinnell; Tracy I. Storer, by Alden H. Miller; and Clinton G. Abbott, J. S. Cooper, Joseph Mailliard, Gayle B. Pickwell, Wright M. Pierce, John G. Tyler, and Curtis Wright, by George Willett. Mr. John H. Baker, Executive Director of the National Association of Audubon Societies, was present as a guest.

Minutes of the Fourteenth Annual Meeting were read and approved. Report of the Auditing

Committee, that the Business Managers' accounts for 1935 had been examined and found correct, was read and accepted.

The Business Managers' report was submitted by John McB. Robertson. The year 1935 started with a balance in the General Fund of \$1,531.76 and ended with a balance of \$1,690.09. Endowment Fund investments have a value of \$11,473.75 (bonds listed at par and stocks at cost). In anticipation of the cost of Pacific Coast Avifauna No. 23, *Birds of Nevada*, two members advanced a total of \$488.65, to be refunded as money becomes available from the sale of Avifaunas. Nine members donated a total of \$200.00 toward extra cost of printing the Micheners' Mockingbird paper in the Condor for May, 1935. A gain of twenty-four members and subscribers was made during the year. The Chair appointed as Auditing Committee for 1936: J. R. Pemberton, Chairman, Wright M. Pierce and Curtis Wright.

Report of the Editors, with respect to the Condor, from July, 1935, to March, 1936, was read by Alden H. Miller. Change of printers was announced, the handling of the magazine since January 1, 1936, being done by the James J. Gillick Company, of Berkeley, this change resulting in a saving in both time and cost. The attention of the Board was called to the continuation of portraits of prominent ornithologists, and to some outstanding articles in the last five issues of the Condor. Jean M. Linsdale reported the issuance of Avifaunas Nos. 23 and 24 during the year. The former, *The Birds of Nevada*, by Jean M. Linsdale, contained 145 pages, with one outline map. The latter, *The Birds of the Charleston Mountains, Nevada*, by A. J. van Rossem, contained 65 pages and 13 illustrations. Joseph Grinnell reported that the May issue of the Condor, then in press, would contain the roster of members, revised to April 20, 1936.

The Secretary read a letter from the President of the Ecological Society of America asking co-operation in opposing H.R. Bill 9275, "to permit mining within the Glacier Bay National Monument." Moved by Howard Robertson, seconded by Joseph Dixon, and duly carried that letters protesting passage of this bill be sent and that they also include objection to the passage of the "Grand Lake Big Thompson Diversion Project" in Rocky Mountain Park. Alden H. Miller read the following resolution regarding the death of George M. Wright:

The tragic death of George M. Wright on February 25, 1936, has taken from the Board of Governors of the Cooper Ornithological Club one of its youngest and most valuable members. His accomplishments in conservation through his office as Chief of the Wildlife Division of the National Park Service were marked by excellent judgment and decisive action. An idealist with a sense of practicability, he dedicated his life in entirely unselfish fashion to the preservation of wildlife and the building of agencies to further this cause. Personal charm and great executive ability made him highly valued as leader and friend. It is

a matter of deepest regret that the future of the Club and of conservation must be without his talented services. Be it therefore

Resolved that the Board of Governors of the Cooper Ornithological Club express its deep sorrow because of the loss of this valued member and its appreciation of the great benefit his life has been to the Board of Governors, to the Club, to the Club's objectives, and to the individual members. Be it further

Resolved that the Secretary be instructed to transmit a copy of these resolutions with the sincere sympathy of the Board of Governors to Mrs. Wright.

The resolution was unanimously adopted.

Joseph Dixon submitted a list of recommendations regarding poisoning campaigns of the Federal Emergency Conservation Program. A careful check on all poisoning was advocated, both as to necessity and methods used. After discussion by Mr. Dixon and Mr. John H. Baker, it was voted to indorse this list of recommendations.

Motion made and seconded that expense of sending notice of meetings of the Corporation be met from the General Fund. Carried. The Chair appointed as committee to nominate officers of the Board of Governors for the ensuing year: R. B. Cowles, Chairman, and Luther Little, a third member of the committee, Loye H. Miller, being nominated from the floor. The committee nominated for President, George Willett; for Vice-President, Alden H. Miller; for Secretary, Laura B. Law. It was voted that the nominations be closed and the nominees declared elected.

A unanimous vote of thanks was tendered Howard Robertson for entertaining the Board at the dinner meeting.

Mr. John H. Baker spoke of measures proposed by the National Association of Audubon Societies to aid in protection of the California Condor. After discussion by various members, the Chair appointed the following committee to cooperate with the Audubon Societies: Harry Harris, Chairman, Sidney B. Peyton and W. Lee Chambers. A vote of appreciation was given Wright M. Pierce and J. R. Pemberton for their work in arranging the Eleventh Annual Meeting of the Club.

Adjourned.—GEORGE WILLETT, *Secretary*.

ANNUAL MEETING OF THE COOPER ORNITHOLOGICAL CLUB, INCORPORATED

The business session was called to order in the Lecture Hall, Los Angeles, Museum, Los Angeles, California, at 10:30 a.m., April 17, 1936, by President Howard Robertson. The President appointed John McB. Robertson, J. M. Linsdale and J. R. Pemberton as a committee to examine proxies received. On motion made, seconded, and duly carried, the meeting then adjourned to meet in the same place at 10:30 a.m., April 18, 1936.

The adjourned business session was resumed at 10:30 a.m., April 18, 1936, at the Los Angeles Museum, Los Angeles, California, with President Howard Robertson presiding. George Willett acted as Secretary. The committee appointed to examine proxies reported that 320 proxies had

been found in order and that 120 members of the Club were present. The Chairman therefore declared a quorum present. Minutes of the business meeting held at Berkeley, California, on May 25, 1935, were read and approved.

Mrs. Laura B. Law announced receipt of a letter from Mrs. Florence M. Bailey expressing her best wishes to the meeting and regretting her inability to attend. The Secretary read greetings from Dr. T. S. Palmer, Secretary of the American Ornithologists' Union, Dr. Alexander Wetmore, and Jay N. Darling.

The following committee was appointed by the President to nominate Directors for the ensuing year: R. B. Cowles, Chairman, L. H. Miller and Luther Little. The Committee announced the following nominations: Howard Robertson, W. Lee Chambers, John McB. Robertson, J. R. Pemberton, Joseph Grinnell, Laura B. Law, Alden H. Miller, Jean M. Linsdale and George Willett. It was moved, seconded and unanimously carried that the nominations be closed and the nominees declared elected. Adjourned at 10:40 a.m.—GEORGE WILLETT, *Secretary*.

DIRECTORS' MEETING

A meeting of the Board of Directors of the Cooper Ornithological Club was held at the Los Angeles County Medical Association Building, Wilshire Boulevard and Westlake Avenue, Los Angeles, California, at 9:30 p.m., on Saturday, April 18, 1936, pursuant to notice duly given in accordance with the provisions of the By-Laws. All the members of the Board were present.

President Howard Robertson presided at the meeting and George Willett performed the duties of Secretary. By unanimous vote, the reading of minutes of last meeting was deferred until a future meeting. On motion made, seconded and duly carried, officers were elected for the ensuing year (see p. 130). Each officer so elected accepted his office.

Election of fifty-one members, from and including Herbert Buckalew, no. 844 on Membership Roster, to and including William G. Webb, no. 894 on said roster, was ratified by unanimous vote.

The Treasurer reported letters of resignation from the following members of the Club: Harvey T. Anderson, Jr., Finn Theodore Malm, J. H. Trumbull, Charles L. Whittle, William Youngworth, Robert W. Williams, Miss Alice J. Swasey, Joseph H. Wales, Mrs. Lewis Osborne, Miss Ivander MacIver, Eugene R. Pike, Charles de Forrest Pettit, A. G. Lawrence, Miss Leonora A. Hohl, John C. Fortner, Frank L. Farley, Mrs. Howard F. Fletcher, Mrs. Jane F. Easton, Henry L. Beadel, Mrs. Mary E. McLellan Davidson. It was voted unanimously that these resignations be accepted. On motion made, seconded and duly carried, the meeting adjourned. — GEORGE WILLETT, *Secretary*.

